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Philip M. Roedel, *Director*

FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

Commercial Fisheries Abstracts contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.

0.116 (6.54) FOOD APPLICATIONS FOR MEMBRANE ULTRAFILTRATION

Porter, M. C., and A. S. Michaels (Amicon Corporation, Lexington, Mass.)
Food Product Development 5, No. 1, 64, 66-67 (February-March 1971)

Membrane ultrafiltration (MUF) is filtration under suction or pressure through a semipermeable membrane; it is used in the separation of relatively high molecular weight solutes (molecular weight greater than 500) such as proteins, polymers, (starch, gums), and colloidally dispersed substances. Interest in its use in food processing stems from the possibility that it permits economical processing of food products without loss of quality of the food. In this article the authors discuss application of membrane ultrafiltration in various food products (dairy, egg, meat, fish, vegetable, single cell protein).

In the production of fish protein concentrate, MUF can provide economical concentration at low temperatures of the isopropanol-water extract of the whole fish. Also MUF could be used in the production of hydrolyzed FPC. The membrane will retain the enzymes which can be returned to the reactor. Furthermore, because the products of proteolysis partially inhibit enzyme action, removal of such products improves the rate of hydrolysis.

[1 illustration, 1 table, 24 references] FTP

0.30 (2.01)(0.5) EFFECTS OF FOUR SPECIES OF BACTERIA ON PORCINE MUSCLE. 1. PROTEIN SOLUBILITY AND EMULSIFYING CAPACITY

Borton, R. J., L. J. Bratzler, and J. F. Price (Department of Food Science, Michigan State University, East Lansing, Mich. 48823)
Journal of Food Science 35, No. 6, 779-782 (November-December 1970)

The purpose of this study was to determine the effect of inoculating porcine muscle with specific cultures of bacteria on protein solubility and emulsifying capacity of the muscle. Samples of porcine muscle, aseptically obtained, were inoculated with cultures of Pediococcus cerevisiae, Micrococcus luteus, Leuconostoc mesenteroides, and Pseudomonas fragi. The samples inoculated with bacteria were compared with aseptic control samples during storage for 20 days at 2° and at 10° C. The four organisms grew at 10° C. but only the Pseudomonas fragi and L. mesenteroides grew at 2° C. A loss occurred in the water-soluble protein fraction during storage of the controls and of the M. luteus treated and the L. mesenteroides treated samples. Samples of porcine muscle inoculated with Pseudomonas fragi showed an initial loss of water-soluble protein fraction, followed by an increase.

The amount of meat proteins soluble in a salt solution increased during the first 8 days of storage of all samples, then decreased or remained relatively constant. The insoluble protein in the P. fragi samples decreased but increased for the other samples. The amount of nonprotein nitrogen increased for all treated samples and for the control samples during the storage period (20 days).

The pH values increased with growth of M. luteus and P. fragi and decreased with growth of Pediococcus cerevisiae and L. mesenteroides.

(over)

0.321 (1.959) COMPARATIVE STUDY OF SERUM PROTEINS IN FOUR DOLPHIN SPECIES (CETACES-ODONTOCETES)

Gallien, C. L., and M. Th. Chalumeau-le-Foulgoc (Laboratoire d'Embryologie, Faculté des Sciences de Paris, 9 Quai St.-Bernard, Paris V^{e}) and J. M. Fine (Laboratoire d'Immunochimie du Centre National de Transfusion Sanguine, rue A.Cabanel, Paris XV^{e}, France)
Comparative Biochemistry and Physiology 37, No. 3, 375-385 (December 1, 1970)

To learn more about speciation characters, the authors analyzed comparatively the serum of 28 dolphins belonging to four species that differ morphologically--Delphinus delphis, Linné (9 males and 2 females); Stenella styx, Gray (5 males and 6 females); Grampus griseus, Cuvier (1 female); and Globicephala melaena, Traill (5 males). G. melaena and G. griseus were clearly differentiated from D. delphis and S. styx; although the four groups were closely related, G. melaena serum was the only one showing an immunological difference.

Electrophoretic analysis revealed at least 21 constituents in D. delphis serum 12 were antigenically defined with an anti-D. delphis antiserum. At the serum protein level, this species is almost identical to S. styx. Only 16 constituents were found in the serum of G. griseus; 12 were antigenically defined with anti-D. delphis and anti-S. styx antisera; all are common to the three species. The serum of G. melaena had 17 constituents. After the anti-D. delphis and anti-S. styx antisera were drained by G. melaena serum, they still possessed one antibody that reacted with a ß-1-globulin in the sera of the other three species; the G. melaena serum apparently lacks this ß-1-globulin.

(over)

0.33 IDENTIFICATION OF CARBONYL AND SULFUR COMPOUNDS FROM NONENZYMATIC BROWNING REACTIONS OF GLUCOSE AND SULFUR-CONTAINING AMINO ACIDS

Arroyo, P. T., and D. A. Lillard (Department of Food Technology, Iowa State University, Ames, Iowa 50010)
Journal of Food Science 35, No. 6, 769-770 (November-December 1970)

The reactions between amino acids and sugars may contribute to the flavor in food on processing or cooking. In the present study, the researchers examined the Maillard reaction of the sulfur-containing amino acids with sugar, because the sulfur amino acids are undoubtedly an important source of flavor compounds in meat. They also used glucose in their experiments because it was found in greatest quantity, when compared to fructose and ribose, in beef, pork, and lamb. Their work was designed to (1) confirm the characteristic aromas emitted by amino acid (sulfur containing)-glucose mixtures, (2) determine the volatile reaction products of the amino acid-glucose mixtures that account for the characteristic aromas, and (3) examine the effect of pH on the amino acid-glucose reactions. Odor evaluations, chemicalanalyses, and the effect of pH on the nonenzymatic browning reaction products between equimolar concentrations of glucose and each of methionine, cysteine, and cystine were carried out. The reaction mixtures were heated for 2 hours at 98(±2°) C. The pH values of the reaction mixtures tested were about 6.5, 7.0, 7.5, and 8.0 (pH adjustments were made before heating the mixture).

None of the three amino acid-glucose mixtures produced on odor associated with meat. The methionine-glucose mixture produced an objectionable odor associated with boiled potato; the cysteine-glucose mixture, an odor resembling over-boiled

(over)

0.30 (2.01)(0.5)

The emulsifying capacity of the samples was not influenced by the growth of M. luteus or P. cerevisiae; the emulsifying capacity of the samples decreased with growth of L. mesenteroides; the emulsifying capacity of the samples increased with growth of Pseudomonas fragi.
[9 figures, 1 table, 19 references]

FTP

0.33 (0.38)

PROTEIN-METAL ION BINDING SITE: DETERMINATION WITH PROTON MAGNETIC RESONANCE SPECTROSCOPY

Rose, P. I. (Research Laboratories, Eastman Kodak Company, Rochester, N.Y. 14650)
Science 171, No. 3971, 573-574 (February 12, 1971)

The author reports a technique that has enabled the unambiguous identification of metal binding sites of a biological polyelectrolyte. He suggests that the technique may have promise in the study of metal-activated enzymes and other metalloproteins. The proton magnetic resonance spectra of aqueous gelatin were examined relative to composition and molecular interactions. Aqueous gelatin complexes cobaltous ions in the pD range of ~3.5 to 7.5; glutamyl and aspartyl side chains are the sites of binding. [1 figure, 11 references]

FTP

0.118 (9.14)(.16)

A CONSTANT FLOW DELIVERY DEVICE FOR CHRONIC BIOASSAY

Freeman, Robert A. (Department of Fishery and Wildlife Biology, Colorado State University, Fort Collins, Colo. 80521)
Transactions of the American Fisheries Society 100, No. 1, 135-136 (January 1971)

A low cost, mechanically simple device for delivering predetermined amounts of solution over extended periods has been developed for flow-through bioassay experiments. The device is particularly well suited to situations where the solubility of additives is high. It should prove an effective means of administering various antibiotics to hatchery water supplies as well. Working on the siphoning principle, the device provides a means of dosing various experiments with precision and dependability. A glass siphoning tube is supported on a float from which a funnel and tubing system directs the solution out through the base of the solution reservoir. As long as the delivery end of the siphon tube remains at a constant level in relation to the solution surface, flow through the tube will remain constant.

Three of these devices are being used in an aluminum toxicity flow-through bioassay where they have functioned continuously for forty-five days. Flow variances for these devices, determined by 135 to 160 separate measurements for each, averaged 1.147. Strong supports must be devised for these devices, as the full drum weighs nearly 500 lbs. Total cost of construction should not exceed $10.00 per unit. [2 figures]

Reprinted in part

0.30 (2.01)(0.5)

EFFECTS OF FOUR SPECIES OF BACTERIA ON PORCINE MUSCLE. 2. ELECTROPHORETIC PATTERNS OF EXTRACTS OF SALT-SOLUBLE PROTEIN

Borton, R. J., L. J. Bratzler, and J. F. Price (Department of Food Science, Michigan State University, East Lansing, Mich. 48823)
Journal of Food Science 35, No. 6, 783-786 (November-December 1970)

This article reports on a study designed to determine if growth of specific bacteria on porcine muscle altered the electrophoretic behavior of the salt-soluble extract of the inoculated muscle. Two methods of electrophoresis were used: starch-urea gel and disc-urea gel. Porcine muscle samples were inoculated with cultures of Micrococcus luteus, Leuconostoc mesenteroides, Pediococcus cerevisiae, and Pseudomonas fragi and stored at 2° or 10° C. for 20 days. Aseptic samples of the muscle were used as controls. Examinations of the samples were made initially (0 day) and after 8 and 20 days of storage.

Extracts (0.6 M KCl) of the muscle samples inoculated with Pediococcus cerevisiae, L. mesenteroides, and M. luteus did not differ from the control when examined by starch-gel and disc-gel electrophoresis. Extracts of samples inoculated with Pseudomonas fragi showed a loss in the number of protein bands, indicating that this organism exhibited some effect on the myofibrillar proteins.

FTP

[4 figures, 5 references]

0.33

egg; the cystine-glucose mixture, no significant odor. The researchers attributed the aroma from the methionine-glucose mixture to mercaptans. The sulfur compounds identified from the various mixtures are shown in the table that follows.

Compounds identified from heated mixtures of:	
Methionine and glucose	Cysteine and glucose
Methyl mercaptan	Methyl mercaptan
Ethyl mercaptan	Ethyl mercaptan
Propyl mercaptan	Propyl mercaptan
Dimethyl sulfide	Pentyl mercaptan
Dimethyl disulfide	

[3 tabs, 17 refs]

0.321 (1.959)

Other differences between the D. delphis-S. styx group and the G. melaena-G. griseus group are shown, particularly at the transferrin level (the former have a group system of transferrins).
[11 figures, 1 table, 36 references]

LB

0.3 METAL ION CONTROL OF CHEMICAL REACTIONS

Busch, Daryle H. (Chemistry Department, Ohio State University, Columbus, Ohio 43210)
Science 171, No. 3968, 241-248 (January 22, 1971)

Metal ions may control many kinds of chemical reactions. For the purpose of this review, the author classifies the interaction between metal atom and reactants in three levels according to the intimacy of the interaction. In the first level, the metal ion serves to alter the character of the medium by changing ionic strength, by solvent structuring or destructuring, or possibly by other characteristics of the medium--all of which require long-range interaction between metal ion and reactant. In the second level, the metal ion serves as a reactant. In these metal is a projectile that produces reaction when it encounters the substrate. In the third level, the interaction involves prior association of the metal ion with a substrate that is to undergo subsequent reaction, either unimolecularly or upon encounter with suitable reagents. In this category, the metal ion is a substrate. In the article discusses the author last two levels of interaction between metal ions may control many kinds of chemical reactions. For the purpose of

[3 tables, 61 references]

FTP

0.33 CHARACTERIZATION OF SOME INVERTEBRATE TROPOMYOSINS

Woods, E. F., (Division of Protein Chemistry, CSIRO, Parkville (Melbourne), Victoria 3052, Australia), and Margaret J. Pont
Biochemistry 10, No. 2, 270-276 (January 19, 1971)

This research involved a study of the physicochemical properties and subunit structures of tropomyosins from crayfish (two species), oyster, abalone, and blowfly. In 1968, E. F. Woods [Symposium on Fibrous Proteins Australia, 1967, W. G. Crewther, ed., Sydney, Butterworths, p. 133] reported that the molecular weight of crayfish tropomyosin in a denaturing solvent (8 M urea) was lower than that found for vertebrates. Also, Woods found that the solutions in 8 M urea were heterogeneous and that high-speed equilibrium sedimentation showed the presence of species of molecular weight less than 10,000. In the present study, the authors examined further the nature of the heterogeneity of crayfish tropomyosin in dissociation solvents. Because crayfish tropomyosin is salted out over a different range of ammonium sulfate concentration to that for vertebrate tropomyosins, the authors paid particular attention to the fractionation procedure in order to obtain preparations of maximum α-helix content.

The minimum molecular weights of the tropomyosins were 65,000-80,000--in the same range as reported values for vertebrate tropomyosins. In 7 M guanidine hydrochloride, abalone tropomyosin gave a subunit size of 35,000±2,000; oyster and blowfly tropomyosins gave slightly lower values. Crayfish tropomyosins were heterogeneous in denaturing solvents and a homogeneous subunit was not obtained after gel filtration. The molecular lengths of all invertebrate and vertebrate tropomyosins appear to be identical.

(over)

0.35 (9.13) SEA URCHIN EMBRYOS ARE PERMEABLE TO ACTINOMYCIN

Greenhouse, Gerald A., Richard O. Hynes, and Paul R. Gross (Department of Biology, Massachusetts Institute of Technology, Cambridge, Mass. 02139; Marine Biological Laboratory, Woods Hole, Mass.)
Science 171, No. 3972, 686-689 (February 19, 1971)

In earlier work [P. R. Gross and G. H. Cousineau, Exp. Cell Res. 33, 368 (1964); P. R. Gross, L. I. Malkin, W. A. Moyer, Proc. Nat. Acad. Sci., U.S. 51, 407 (1964)], actinomycin was used as an inhibitor of RNA synthesis in studies on gene expression during sea urchin development. Recently, claims were made [M. M. Thaler, M. C. L. Cox, C. A. Villee, Science 164, 832 (1969)] that the actinomycin does not enter the embryos before hatching (under this circumstance, the validity of conclusions drawn from such experiments may be doubtful). Because the concepts developed from actinomycin experiments are important in development biochemistry, we must be certain of the permeability of early stages to the drug. Data reported in this article prove that the drug does penetrate eggs and cleavage stages, and justifies use of the drug as a tool in the analysis of gene expression.
[4 figures, 13 references] FTP

0.36 COMPARISON OF MYOGLOBINS FROM HARBOR SEAL, PORPOISE, AND SPERM WHALE. VI. RENATURATION OF COPPER(II)-DENATURED FERRIMYOGLOBINS

Marks, Richard H. L., Eugene H. Cordes, and Frank R. N. Gurd (Department of Chemistry, Indiana University, Bloomington, Ind. 47401)
Journal of Biological Chemistry 246, No. 2, 466-474 (January 25, 1971)

Information on the kinetics of transconformation reactions of proteins is important for the understanding of protein stability, reactivity, and catalytic capacity. The kinetics of the recovery of native structure of a protein that has been denatured is of particular interest. The present article is the 42nd in a series dealing with coordination complexes and catalytic properties of proteins and related substances.

Earlier research had demonstrated overall similarities in the denaturing effects of copper(II) ion on the myoglobins of sperm whale (Physeter catodon), harbor seal (Phoca vitulina), and harbor or common porpoise (Phocaena phocaena) [C. R. Hartzell, R. A. Bradshaw, K. D. Hapner, and F. R. N. Gurd, J. Biol. Chem. 243, 690 (1968)], and on preparation of the sperm whale protein alkylated by iodoacetamide [C. R. Hartzell, K. D. Hardman, J. M. Gillespie, and F. R. N. Gurd, J. Biol. Chem. 242, 47 (1967)]. In the present article, the authors contribute further information to the definition of the nature of the products formed in the presence of excess copper(II) ion, and discuss in detail the renaturation process that takes place when the copper(II) is removed from such preparations. They also describe the effects of pH, temperature, and ionic strength on the kinetics of the renaturation process and compare the reactivities of the proteins from the three different species. [4 figures, 5 tables, 46 references] FTP

0.36 (0.35) THE TRYPTIC DIGESTION OF SPIN-LABELLED HEAVY MEROMYOSIN

Seidel, J. C., M. Chopek, and J. Gergely (Department of Muscle Research, Boston Biomedical Research Institute; Department of Neurology, Massachusetts General Hospital; and Department of Neurology and Biological Chemistry, Harvard Medical School, Boston, Mass. 02114)
Archives of Biochemistry & Biophysics 142, No. 1, 223-230 (January 1, 1971)

In this study the researchers selectively spin labeled the S_1 thiol groups of heavy meromyosin (HMM) with a paramagnetic analog of iodoacetamide and studied the effects of tryptic digestion on the ESR spectrum and ATPase activity of spin-labeled HMM. The objective was to determine whether the tryptic digestion of HMM produces any enzymatically active fragments that lack S_1 thiol groups. Apparently, myosin having S_1 groups selectively spin labeled is an ideal system for studying the effects of tryptic digestion on the fate of S_1 thiol groups. The researchers compared the rate of the appearance of peptides containing spin-labeled S_1 groups with changes in ATPase activity during tryptic digestion of S_1-spin-labeled HMM. They found that the loss of ATPase activity on tryptic digestion occurs at the same rate with spin-labeled or unlabeled HMM--suggesting that spin labeling produces no major change in the conformation of HMM. The rate at which spin-labeled peptides are released on tryptic digestion is slower than that for the formation of subfragment-1. The release of S_1-labeled peptides parallels the loss of ATPase activity. The authors found no evidence for the existence of an enzymatically active subfragment-1 lacking S_1 thiol groups.
[9 figures, 18 references] FTP

0.35 SYNTHESIS AND DECAY RATES OF MAJOR CLASSES OF DEOXYRIBONUCLEIC ACID LIKE RIBONUCLEIC ACID IN SEA URCHIN EMBRYOS

Brandhorst, Bruce P. (Department of Biology, University of California at San Diego, La Jolla, Calif. 92037), and Tom Humphreys
Biochemistry 10, No. 5, 877-881 (March 2, 1971)

This paper describes a method for measuring the instantaneous rates of synthesis and the spectrum of stabilities of unstable RNA by analyzing the kinetics of entry of radioactive adenosine into ATP and into RNA. The authors applied the method to sea urchin embryos during their development when the level of accumulation of heterogeneous, unstable RNA with DNA-like base compositions decreases substantially. Apparently, the RNA fell into two classes (as determined on the basis of stability). One-third of the steady-state level of unstable RNA has a half-life of 5-10 min.; the remaining two-thirds has a half-life of 60-90 min. The authors state that this spectrum does not change between blastula and pluteus stages, while the instantaneous rate of synthesis of RNA per nucleus is decreasing.
[4 figures, 19 references] FTP

0.38 (1.92) 5′-NUCLEOTIDASE ACTIVITY IN THE TISSUES OF THE FRESHWATER MURREL, OPHICEPHALUS PUNCATATUS BLOCH

Jafri, A. K., Syed Shafi Asghar, and D. K. Khawaja (Department of Zoology and Chemistry, Aligarh Muslim University, Aligarh, India)
Enzymologia 39, No. 4, 205-210 (1970)

Since the activity of 5′-nucleotidase is closely related to the control of the concentration cycle of AMP, which may be related to the development of rigor, freshness, or flavor quality of the fish, the authors studied this enzyme from the standpoint of both comparative biochemistry and the use of fish as food. They found marked variations in its activity from organ to organ--the highest activity being in the heart (3.50 μmoles inorganic phosphorus released/hour/mg. protein), the pyloric ceca (3.22), and the spleen (2.20). It was fairly active in the intestine (1.78), kidney (1.70), liver (1.60), and stomach (1.22). Relatively low activity appeared in the ovary (0.94) and muscle (0.54) and quite low activity in the nervous tissues (0.20).

The distribution pattern of 5′-nucleotidase in Ophicephalus punctatus suggested to the authors that the enzyme may have a specific role in each of the fish's tissues. They mention the possibility for each, suggesting that, although the enzyme's activity in the muscle is weak, it may act as a limiting factor for the availability of AMP for AMP-deaminase, which converts AMP to IMP and thus controls the characteristic flavor quality of the fish meat.
[1 table, 24 references] LB

0.33 SUBSTRUCTURE OF THE PARAMYOSIN MOLECULE

Olander, Jitka (Department of Chemistry, Washington Univerisity, St. Louis, Mo.)
Biochemistry 10, No. 4, 601-609 (February 16, 1971)

Results of this study showed that the protein paramyosin consists of two covalent molecular subunits, each having a molecular weight of about 100,000. The author confirmed the existence of an extractable portion of the paramyosin structure and showed that disulfide bonding, if present in the native molecule, is not responsible for this structural stability.
[4 figures, 3 tables, 47 references] FTP

0.33

The author states that the evidence suggests a common subunit molecular weight for all tropomyosins. Crayfish tropomyosin does not contain SH groups nor SS bonds; oyster and abalone tropomyosins appear to have their polypeptide chains linked by a disulfide bond. [6 figures, 3 tables, 32 references] FTP

0.36 A TEMPERATURE-INDUCED TRANSITION IN MITOCHONDRIAL OXIDATION: CONTRASTS BETWEEN COLD AND WARM-BLOODED ANIMALS

Lyons, James M. (Department of Vegetable Crops, University of California, Riverside, Calif.), and John K. Raison (Plant Physiology Unit, CSIRO, Division of Food Preservation, Ryde, New South Wales, Australia)
Comparative Biochemistry and Physiology 37, No. 3, 405-411 (December 1, 1970)

In a previous study, the authors found that differences in oxidative activity of mitochondria isolated from chilling-sensitive plants and from chilling-resistant plants provided evidence that the mitochondria from sensitive plant tissues will give a discontinuous Arrhenius plot for succinate oxidation whereas the mitochondria or resistant plant tissues will not. This discontinuity, and the accompanying change in activation energy, suggested a phase change in the mitochondria that could be related to the membrane lipids. Further investigation revealed a similar discontinuity for succinate oxidation in the mitochondria of rat liver. The transition temperature for the apparent phase change occurred at between 10° and 12° C. in the plant tissues and between 23° and 24° C. in the rat liver.

In the present study, the authors show that the discontinuous Arrhenius plot with a resultant change in activation energy at a transition temperature around 23° C. for succinate oxidation is characteristic of the mitochondria of warm-blooded animals. Mitochondria isolated from rainbow trout (Salmo gairdneri) and channel catfish (Ictalurus punctatus) gave a continuous, linear Arrhenius plot with a uniform activation energy over the entire temperature range from 4° to 30° C. The authors suggest that the discontinuity in the warm-blooded animals is related to a direct response to temperature, which induces a phase change in the membrane lipids and causes configurational changes of the membrane-bound enzyme proteins; the phase-change does not occur in fish because the proportion of unsaturated fatty acids in their membrane lipids is higher.
[1 figure, 1 table, 19 references] LB

0.33 EFFECTS OF MOULTING CYCLE AND NUTRITIONAL CONDITIONS ON HAEMOLYMPH PROTEINS IN CARCINUS MAENAS (1.86)(9.13)

Busselen, P. (Department of Physiology, University of Louvain, Belgium)
Comparative Biochemistry and Physiology 37, No. 1, 73-83 (November 1, 1970)

The author studied the effects of moulting, diet, and bleeding on the blood protein of male and female crabs (carapace width from 10 to 35 mm.). Using zone electrophoresis on cellulose acetate at physiological pH, he separated the proteins into three major components: fraction D, a hemocyanin; fraction I, a glycoprotein; and fraction P, a glycolipoprotein. He found no apohemocyanin.

The hemocyanin concentration decreased four- or fivefold during moulting but progressively returned to premolt levels during the intermolt period; glycoprotein disappeared completely at ecdysis but reappeared some 10 days later. The ratio of glycoprotein to hemocyanin markedly decreased during the controlled bleeding experiments. The concentration of glycoprotein was highly dependent on the crabs' nutritional status, completely disappearing during starvation and accumulating in the blood during periods of excessive feeding.
[3 figures, 2 tables, 41 references] LB

0.38 (1.82) GLYCOLYTIC AND GLUCONEOGENIC ENZYMES IN THE QUAHOG, MERCENARIA MERCENARIA

Engel, Robert H., and Marilynn J. Neat (Wm. F. Clapp Laboratories, Inc., of Battelle Memorial Institute, Duxbury, Mass.)
Comparative Biochemistry and Physiology 37, No. 3, 397-403 (December 1, 1970)

In preparation for a study of the chronic effects of sublethal levels of chlorinated hydrocarbons on molluscan metabolism, the authors identified in the foot, mantle, and gill tissue of quahog a number of the key enzymes that regulate the flow of glycolytic intermediates in the direction of glycolysis or gluconeogenesis. They also determined the effect of partial starvation on these enzymes.

The catalytic rates of each enzyme are shown in the table on back of card. These rates averaged about 4% of those reported by Scrutton and Utter (1968) for rat liver but were generally similar in proportional enzyme activity to those in mammalian tissue. Under conditions of partial starvation, changes in the levels of glycogen (e.g., from 35.7±3.7 mg./g. wet weight to 13.7±2.1 mg./g. wet weight in the foot--a decrease of 62%), glucose-6-phosphate dehydrogenase, and fructose diphosphate were also similar to those in mammalian tissue.

(over)

0.4 AFLATOXIN P_1: A NEW AFLATOXIN METABOLITE IN MONKEYS

Dalezios, John, and Gerald N. Wogan (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, Mass. 02139), and Steven M. Weinreb (Department of Chemistry, Massachusetts Institute of Technology)
Science 171, No. 3971, 584-585 (February 12, 1971)

Aflatoxin B_1 shows high potency as a hepatocarcinogenic agent in animals. Different species respond differently to the toxin. Information on the metabolism of aflatoxin B_1 is essential for understanding which aspects of the metabolism determine response and for extrapolation of animal data in estimating human response. In the course of a study of the comparative metabolism of aflatoxin B_1 in the rat and monkey, the authors isolated a new metabolite from the urine of rhesus monkeys and determined its chemical identity. The metabolite is the phenolic derivative of O-demethylation of aflatoxin B_1, appearing in the urine mainly in conjugated form. It is the major urinary metabolite of the toxin and represents the excretory form of about 20% of a single dose of toxin within 24 hours after injection.

If aflatoxin P_1 is a urinary metabolite of aflatoxin B_1 in man and its excretion is quantitatively related to aflatoxin B_1, then, the authors suggest, human exposure to the toxin could be estimated by analysis of urine samples.
[1 figure, 13 references] FTP

0.39 (1.69)(9.13) EFFECTS OF SUBZERO TEMPERATURES AND TRAWLING STRESS ON SERUM OSMOLALITY IN THE WINTER FLOUNDER PSEUDOPLEURONECTES AMERICANUS

Umminger, Bruce L. (Department of Biology, Yale University, New Haven, Conn.)
Biological Bulletin 139, No. 3, 574-579 (December 1970)

Since the freezing point of sea water is about 1° C. lower than the freezing point of most marine teleosts' serum, these fish may enter waters where their blood will freeze. Most Antarctic and temperate zone fish avoid freezing by living in a supercooled state; however, some Antarctic fish can lower the freezing point of their plasma sufficiently to make it isosmotic with sea water. Pearcy (1961) reported that the winter flounder, a marine teleost inhabiting the temperate zone, also has the ability to form an "antifreeze" at subzero temperatures. The author investigated the flounder's ability to lower the freezing point of its serum.

Ten adult specimens of winter flounder caught in January by trawl in Long Island Sound were acclimated to -1° C. (386 mOsm/liter) in the laboratory. Their average serum osmolality was not significantly different from that of fish acclimated to 15° C. (389 mOsm/liter). They were able to survive temperatures as low as -1.5° C. in a supercooled state, but when ice crystals were present in the sea water (temperature -1.8° C.), they froze and died as a result of nucleation of their supercooled blood. Since the serum osmolality of freshly caught flounder increased significantly for up to 6 hr. after capture (and was significantly higher than that of fish acclimated to the same temperature in the laboratory), the author concludes that the antifreeze formation Pearcy found is probably just an increased serum osmolality produced by the stress of capture.
[3 tables, 13 references] LB

0.5 (9.19) THE GAUZE PAD METHOD FOR THE ISOLATION OF VIRUSES FROM INLAND AND ESTUARINE WATERS

Miller, Louise T., and Oscar C. Liu (Water Resources Center, Rhode Island Univ., Kingston, R.I.)
Technical completion report 1 Jul 69-30 Jun 70, 14 pp. (1970)
U.S. Government Research & Development Reports 71, No. 1, 59 (January 10, 1971)
Available from the National Technical Information Services, Operations Division, Springfield, Va. 22151. Order No, PB-195 310, $3.00; microfiche 95¢.

The ultimate objective of this study was to examine the viral flora of waters from estuaries, inland ponds and streams of Rhode Island. However, prior to carrying out field examination, it was necessary to evaluate under controlled laboratory conditions these methods currently available for sampling, concentration and isolation of viruses with a view to selecting the most effective method or designing a method which would simplify sampling and improve recovery. The methods evaluated included the gauze pad technique, adsorption and elution from chemical flocs, combined flocculation and centrifugation, sonnication, and finally adsorption and elution from magnetic iron ore. The gauze pad was found to be inefficient for recovering virus from fresh water but its efficiency was enhanced slightly by the presence of inorganic salts in water, e.g., sea water. Combined flocculation and centrifugation improved viral recovery, but showed selectivity in the viruses recovered. The best results were obtained by adsorbing virus onto magnetic iron oxide followed by elution with blood serum solutions. (Author) Reprinted

0.38 STUDIES ON RAINBOW TROUT ALDOLASE. I. PURIFICATION OF THE ALDOLASE FROM RAINBOW TROUT MUSCLE

Nagahisa, Eizo, and Yasuhiko Tsuchiya (Department of Fisheries, Faculty of Agriculture, Tohoku University, Sendai, Japan)
Tohoku Journal of Agricultural Research 21, No. 1, 32-39 (March 1970)

This paper describes the isolation of and properties of the enzyme aldolase from rainbow trout muscle. Aldolase was extracted from the muscle then crystallized from solution at pH 7.5 by the addition of ammonium sulfate.
[5 figures, 2 tables, 16 references] FTP

0.5 MICROBIOLOGY AND FOOD (9.6)

Ford, Brian J.
Published by Northward Publications Ltd., n.d., 212 pp. £ 2.10
Reviewed by Roger Lewin.
New Scientist and Science Journal 49, No. 741, 513-514 (March 4, 1971)

The reviewer states that this book should be valuable to public health officials, doctors interested in food poisoning, caterers, and students of food technology. The book is not just a reference work, but is an aid to promoting deeper understanding of the true biological relationships between food and those who eat the food. It contains a section on nutrients, another on the science of cooking, and a large chapter on "the nature of the organisms"--i.e., bacteria, fungi, protozoa, and common viruses. FTP

0.38 EFFECT OF SULFUR DIOXIDE AND OZONE ON ACETYLCHOLINESTERASE

P'an, Alice Y. S., and Zygmunt Jegier (Sch. Public Health, Univ. Montreal, Montreal, Quebec, Canada)
Chemical Abstracts 74, No. 1, 492q (January 4, 1971)

0.38 (1.82)

Catalytic rates of glycolytic and gluconeogenic enzymes in quahog tissue

Enzyme	Tissue					
	Foot		Gill		Mantle	
	A	B	A	B	A	B
Hexokinase	0.16±0.02	100	0.21±0.02	100	0.09±0.04	100
Glucose-6-phosphate dehydrogenase	0.22±0.03	137	0.71±0.16	338	0.30±0.02	333
Phosphofructokinase	0.15±0.02	125	0.13±0.01	62	0.19±0.02	212
Fructose diphosphate	0.18±0.01	150	0.45±0.02	214	0.30±0.03	333
Pyruvate kinase	8.42±0.47	5260	5.43±0.21	2580	2.34±0.18	2600
Phosphoenolpyruvate carboxytransphosphorylase	0.25±0.05	156	negligible	negl.	negligible	negl.
Lactic dehydrogenase	1.05±0.11	668	0.33±0.06	168	0.32±0.08	466

A = μmoles/min./g. wet weight
B = percent relative to hexokinase in each tissue
Errors are standard errors of the mean, 6 to 10 quahogs per group.
[2 tables, 22 references] LB

0.5 MICROBIAL DEGRADATION OF ORGANIC MATTER IN THE DEEP SEA (9.19)

Jannasch, Holger W. (Woods Hole Oceanographic Institution, Woods Hole, Mass. 02543), Kjell Eimhjellen (Department of Biochemistry, The Technical University of Norway, Trondheim, Norway), Carl O. Wirsen, and A. Farmanfarmaian
Science 171, No. 3972, 672-675 (February 19, 1971)

Food materials (sandwiches of bread and bologna, apples, soup) from the sunken and recovered research submarine Alvin were in a strikingly well-preserved state after they had been exposed for more than 10 months to deep-sea conditions (depth, 1,500 m.; temperature, about 3° to 4° C.; pressure, about 150 atm.). The rates of microbial degradation of food products appears to be 10 to 100 times slower in the deep sea than in controls under comparable temperatures. The fruit recovered from the Alvin (after 10 months of exposure to deep-sea conditions) showed a degree of preservation that equaled that of careful storage; the starch and proteinaceous materials showed a degree of preservation surpassing that of normal refrigeration. The authors suggest that their findings have important implications concerning the use of the deep sea as a dumping site for organic wastes; the low rates of microbial activity at deep-water conditions render deep-sea disposal of waste very inefficient.
[2 figures, 3 tables, 10 references] FTP

0.5 HISTIDINE DECARBOXYLASE IN THE MICROFLORA OF FROZEN OCEAN FISH (3.2494)(0.38)

Iliev, Rositsa (Vet. Inst. Infec. Parasit. Dis., Sofia, Bulgaria)
Chemical Abstracts 73, No. 25, 128035q (December 21, 1970)

0.4 PHARMACOLOGICAL DEPLETION OF ADIPOSE PESTICIDE RESIDUES (9.19)(6.13)

Davies, J. E. (Department of Medicine, University of Miami, Miami, Fla.)
Clinical Research 19, No. 1, 27 (January 1971)

During a larger study, the author noted that residues of DDT and dieldrin (which are ingested along with virtually all foods) were low, or even absent, in both institutionalized patients and ambulatory noninstitutionalized epileptics being treated with anticonvulsants. He attributed the phenomenon to phenytoin or phenobarbital medication. In an additional study, 14 volunteers were given oral diphenylydantoin for from 3 to 9 months. Residues of DDT in their adipose tissue were reduced to 25%, DDE to 39%, and dieldrin to 27%; those in 9 controls given placeboes over the same period showed no significant decline. The half-life of DDT, DDE, and dieldrin in the controls was 26, 18, and 12 months, respectively; in the phenytoin-treated group it was 6.4, 7.2, and 4.4 months, respectively.

Although the author does not recommend pharmacological reduction of pesticide residues in man at this time, he does suggest that it has great potential in animal food sources. LB

0.31 CHEMILUMINESCENCE ACCOMPANYING THE FORMATION OF LIPID PEROXIDES IN BIOLOGICAL MEMBRANES. IV. ROLE OF THE CHANGE OF IRON VALENCY IN THESE PROCESSES (4.21)

Suslova, T. B., V. I. Olenev, M. V. Korchagina, and Yu. A. Vladimirov (2nd Moscow Med. Inst., Moscow, U.S.S.R.)
Chemical Abstracts 73, No. 21, 105571x (November 23, 1970)

0.5 IDENTIFYING YEASTS
(9.6)

Barnett, James A. (reviewer)
The Yeasts: a Taxonomic Study, 2nd edition, 1970, xvi + 1,385 pp. £27.40
J. Lodder (editor)
Published by North-Holland, Amsterdam and London
Nature 229, No. 5286, 578 (February 19, 1971)

This revised, enlarged edition of a book for identifying yeasts contains contributions from 14 authors. They have examined 4,300 strains and, on the basis of between 40 and 60 physiological tests, classified them into 39 genera and 349 species. The macroscopical and microscopical appearance; the life cycle, if known; and the ability to use 30 or 40 organic compounds as sole sources of carbon for aerobic growth (5 to 13 of them for semi-anaerobic fermentation) of each species are given in extensive detail. Each chapter has a bibliography, and, although there is no general index, the book has a comprehensive index to the names of taxa, making it easy to find the currently accepted synonym for almost any yeast. Whereas the first edition of the book included excellent drawings that greatly helped identification, in this second edition a number of species are illustrated meagerly or not at all. LB

0.6 SELECTED PAPERS BY THE WORKING GROUP ON RESEARCH MANAGEMENT
(0.8)(9.2) AT THE 22ND MILITARY OPERATIONS RESEARCH SOCIETY

IEEE Transactions on Engineering Management 16, No. 4, 137-248 (November 1969)
CARD B

"Cost Effectiveness in R&D Organizational Resource Allocation," by Burton V. Dean and Lewis A. Roepcke, pp. 222-242.
[8 figures, 20 tables, 17 references]

"Testing Torque -- A Quantitative R&D Resource-Allocation System," by Ambrose Ben Hutt (Technical Staff, Air Force Flight Dynamics Laboratory, Wright-Patterson Air Force Base, Ohio), pp. 243-248.
[3 figures, 4 references] FTP

0.6 SELECTED PAPERS BY THE WORKING GROUP ON RESEARCH MANAGEMENT
(0.8)(9.2) AT THE 22ND MILITARY OPERATIONS RESEARCH SOCIETY

IEEE Transactions on Engineering Management 16, No. 4, 137-248 (November 1969)
(IEEE Transactions on Engineering Management is published quarterly by the Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, N.Y. 10017)
CARD A

The Working Group examined the problems of research allocation, the coupling between research and development, technological forecasting, and creating the appropriate environment for research and development. The nine papers given at the meeting appear in this issue of the journal.

"A Program of Research on Coupling Relations in Research and Development," by Albert H. Rubenstein and Charles F. Douds (Department of Industrial Engineering and Management Sciences, Northwestern University, Evanston, Ill.), pp. 137-143.

This paper describes the process involved in the transmission and application of research results at one stage of the process to other stages, including final utilization. Among the behavioral aspects of the phenomenon that appear to be crucial are factors influencing the decision of a participant in the process to ask for and/or give information; factors facilitating or inhibiting communication between groups; and the characteristics and behavior of the people occupying coupling, interface, or liaison roles. [3 figures, 22 references]

"Technology Transfer in Practice," by Herman Bieber (Department of Corporate/Government Research, ESSO Research and Engineering Company, Linden, N.J.), pp. 144-147.

(over)

0.8 DESK-TOP MODEL OF HARBOR RESONATORS

James, W. (Queen's University, Kingston, Ontario, Canada)
Journal of the Acoustical Society of America 49, No. 1 (Part 1), 31-32 (January 1971)

From time to time, rectangular resonators have been recommended as a means of eliminating harmful wave frequencies from the spectrum incident upon harbors. The author has found that the effect of such resonators is considerably influenced by the velocity field at the mouth of the resonator--for example, quarter-wavelength resonators are completely ineffective for some harbor-entrance geometries. Therefore he set up a simple, small-scale acoustic model of a generalized harbor entrance. It has yielded results comparable to those yielded by a hydraulic model, but it has the advantage of giving results uninfluenced by imperfect boundaries or reasonable changes in frequency. The results, in addition, are sufficiently accurate to indicate that the method has potential use as an aid in harbor design.
[3 figures, 1 table, 3 references] LB

0.6 (0.8)(9.2)

The author states that technology is primarily transferred by people, not by organization charts or formal reports.

"Relating Organization Goals and Technological Forecasting for Research and Development Resource Allocation," by C. M. Schoman, Jr., D. N. Dick, and T. R. McKnight, pp. 148-161.

This paper discusses a simple and logical method for using Navy exploratory development goals and Navy technological forecast for the allocation of resources to technology to meet future requirements. [11 figures, 12 references]

"Technological Forecasting--Practical Problems and Pitfalls," by Marvin J. Cetron (Headquarters Naval Material Command, Exploratory Development Division, Washington, D.C.), and Donald N. Dick, pp. 161-172.

Technological forecasting is becoming a widespread activity in business. In this article, the authors explain some of the problems and pitfalls in planning and preparing technological forecasts. They examine the factors to be considered in the initial stages of implementing forecasts, the validity of previous forecasts, recent advances, new advances, and forecasting technique, and offer some suggestions for improving technological forecasts. [16 figures, 9 references]

"The Need for Allocating Resources to Combat-Effectiveness Measurements From Initial R&D to Obsolescence," by Norman K. Walker and Charles R. Phillips (Applied Systems Corporation, Rockville, Md.), pp. 173-175.

"Research Project Cost Distributions and Budget Forecasting," by Burton V. Dean (Operations Research Department, Case-Western Reserve University, Cleveland, Ohio), Samuel J. Mantel, Jr., and Lewis A. Roepcke, pp. 176-189. [8 figures, 5 tables]

"Technological Forecasting in a Dynamic Environment," by Marvin J. Cetron and Jacob N. Johnson, pp. 190-222. [16 figures, 9 tables, 15 references]

Continued on Card B

FTP

0.8 ULTRASONIC TRANSDUCERS
(2.146) 2. UNDERWATER SOUND TRANSDUCERS

Woollett, R. S. (Navy Underwater Sound Laboratory, New London, Conn. 06320)
Ultrasonics 8, No. 4, 243-253 (October 1970)

Although the small size of ultrasonic transducers makes them convenient and allows for generous safety factors in their design, they are useful only at short ranges--when ranges of more than a few kilometers are desired, the designer must move into the audiofrequency range. The transducers then become large and heavy, and if their weight and cost are to be kept reasonable, their design must be more sophisticated. Some of the problems designers must solve are those that relate to adapting the transducers to withstanding pressures at the ocean bottom, determining more precisely the power limits of piezoelectric ceramics, and developing more powerful mathematical models for array design.
[16 figures, 1 table, 38 references]

LB

0.8 RADIATION TREATMENT OF SEWAGE

Newland, E. A.
Australian Atomic Energy Commission Research Establishment, Lucas Heights, 8 pp. (September 1970) (U.S. sales only)
Nuclear Science Abstracts 25, No. 1, 15 (January 15, 1971) Report order number (AAEC/Lib/Bib-254) available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Price on request.

Forty-seven references are listed covering the period 1948 to 1970. The references are listed chronologically by year and alphabetically by author within each year. Where applicable, reference is made to an abstract for each article. (Australia) Reprinted

0.6 A NEW LOOK AT MEAT FLAVOR AND AROMA

Hawley, H. B. (Bernard Hawley and Associates)
Food Manufacture 46, No. 1, 37-38 (January 1971)

The roasting of meat is still regarded by many as an art rather than a science. However, developments in the techniques of chromatography, molecular distillation, and mass spectrography have made possible a thorough understanding of the complex chemical reactions and interractions that give rise to the aroma of various types of cooked meats. The author mentions a recent development reported by J. Scheide [Fleischwirtschaft 49, No. 3, 291 (1969)] in which a roast flavor concentrate of high intensity was prepared by the controlled processing of carefully selected mixtures of digestible proteins, fats, and carbohydrates. One or two grams of this concentrate per kilogram of meat product was sufficient to reproduce the natural aroma profile of roasted meat [Haarmann and Reimer G.m.b.H., "H and R Roast-Meat Flavour 'Bratarom' 91970" Ref. G8e, 1970]. Such developments open up attractive possibilities in the production of canned meats, for example, where roasting of the meat is not practicable. [19 references]

FTP

0.6 METHODOLOGICAL PROBLEMS OF LONG-RANGE FORECASTING
(9.2)

Kheinman, S.
Trans. of Voprosy Ekonomiki (USSR) No. 10, 15-28 (1970) by Joint Publications Research Service, Washington, D.C.
U.S. Government Research & Development Reports 71, No. 2, 18 (January 25, 1971) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. JPRS-51841, PC$3.00, microfiche 95¢

The document considers long-range forecasts of the development of production and the economy and of science and technology which are finding broader and broader application in the developed countries of the world. Being the linking element between the forecast and the plan, the economic-political and scientific-technological concepts of a plan are based on the analysis and genetic assessments of forecasts and simultaneously define the main aspects of the perspective plan.
(Author)

Reprinted

0.6 THIRD INTERNATIONAL CONGRESS
(9.4)

Hill, Margaret A. (Procter Department, University of Leeds, England)
Food Manufacture 46, No. 1, 29-31 (January 1971)

The author, a delegate from the United Kingdom, gives her impression of the Third International Congress of Food Science and Technology held in Washington, D.C., in August 1970.

FTP

0.6 SINGLE CELL PROTEIN FROM PSEUDOMONAS
(0.321)

Chinese Petroleum Corp.
German Offen. (Patent) 1,918,705
Chemical Abstracts 74, No. 5, 21901n (February 1, 1971)

1.01 [FISHERIES SURVEYS]
(9.16)

U.S. Government Research & Development Reports 71, No. 2, 68, 69 (January 25, 1971)
Reports available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. PC$3.00, microfiche 95¢

Under a contract between the United States Agency for International Development and the Alabama Agricultural Experiment Station, staff of the latter organization performed fisheries surveys in certain countries. Results of these surveys appear in the following reports:

"Report of Fishcultural Investigations in the Federation of Malaysia. Increasing Fish Production by Improved Fishcultures, Phase I.," by H. S. Swingle and D. D. Moss, 18 pp. (August 15, 1969) Order No. PB-195 900.

"Report of Fishcultural Investigations in East Pakistan. Increasing Fish Production by Improved Fishcultures," by H. S. Swingle and D. D. Moss, 17 pp. (August 15, 1969) Order No. PB-195 901.

"Report of Fishcultural Investigations in Japan. Increasing Fish Production by Improved Fishcultures,Phase I.," by H. S. Swingle and D. D. Moss, 25 pp. (August 15, 1969) Order No. PB-195 902.

"Report of Fishcultural Investigations in South Vietnam. Increasing Fish Production by Improved Fishcultures," by H. S. Swingle and D. D. Moss, 20 pp. (August 15, 1969) Order No. PB-195 903.

"Report of Fishcultural Investigations in Taiwan. Increasing Fish Production by Improved Fishcultures," by H. S. Swingle and D. D. Moss, 27 pp. (August 15, 1969) Order No. PB-195 904.

"Report of Fishcultural Investigations in Thailand, Increasing Fish Production by Improved Fishcultures, Phase I.," by H. S. Swingle and D. D. Moss, 38 pp. (August 15, 1969) Order No. PB-195 905.

(over)

1.0113 SPECIES COMPOSITION AND STRUCTURE OF BENTHIC INFAUNA COMMUNITIES
(2.12) OFF THE COAST OF WASHINGTON

Lie, Ulf, and Dale S. Kisker (Department of Oceanography, University of Washington, Seattle, Wash. 98102)
Journal of the Fisheries Research Board of Canada 27, No. 12, 2273-2285 (December 1970)

This paper describes the species composition and structure of three benthic infauna communities off the coast of Washington (U.S.A.). Some of the information is summarized in the following table.

(over)

1.0116 THE DELAWARE OYSTER INDUSTRY: A REALITY?
(1.81)(9.15)

Maurer, Don, Les Watling, and Richard Keck (Marine Laboratories, University of Delaware, Lewes, Del. 19958)
Transactions of the American Fisheries Society 100, No. 1, 100-111 (January 1971)

This study was undertaken to determine the condition of Delaware oyster beds following a catastrophic decline in the late 1950's and 1960's. In 1957 the dockside value of the Delaware oyster industry was $2,227,000, whereas in 1967 the value decreased to less than $40,000 (Fishery Statistics, 1950-1967). The immediate cause of this dramatic reduction in Delaware Bay and lower Chesapeake Bay as well was attributed to the protozoan oyster parasite, Minchinia nelsoni Haskin, Stauber and Mackin, familiarly known as MSX (Sindermann, 1968). Moreover the general degradation of the environment due to domestic and industrial pollution, reduction of suitable substrate, urbanization, and rearrangement of water circulation by dredging and reservoir storage also contributed to the almost complete extinction of oystering in Delaware (Maurer and Price, 1969). Further, Delaware's situation appears to be symptomatic of the general decrease in national oyster production (Engle, 1966).

...Estimates of standing crop of oysters yielded a total of 54,582 bushels covering 236.9 acres (95.9 hectares) in the river beds and 65,482 bushels covering 941 acres (380.8 hectares) in the bay beds. Bay beds were badly depleted whereas certain rivers showed potential as seed areas. The association of high oyster production with a hard shell substrate was demonstrated which emphasized the need for a regular shell planting program. Spat monitoring indicated that setting occurred

(over)

1.0141 THE NORWEGIAN SALMON FISHERY
(1.36)

Berg, Magnus (Department of Freshwater Fisheries, Norway)
Atlantic Salmon Journal No. 4, 16-22 (1970)

Following a brief historical review of the Norwegian salmon fishery, the author summarizes the present status of the fishery. Most of the salmon caught in international waters off the coast of Norway come from Norwegian rivers. The fish that are caught are usually immature, small, thin fish that have been at sea for only two winters. They are often sold as grilse at a greatly reduced price; however, their quality is so bad, the author says, they should never be brought to market at all. Since the greatest part of the catch is composed of females, the spawning stock in Norwegian rivers is being steadily reduced. Foreigners, especially the Danes, catch about as many salmon as the Norwegians do. The total catch from the international fishery has risen rapidly over the past decade, having reached about the same level as that of the Norwegian salmon fishery before World War II. Despite Norway's increasing investments in salmon, the yield of the Norwegian fishery is declining. [5 figures, 2 tables, 3 photographs] LB

1.0113 (2.12)

Description of the benthic infauna community	Most abundant species in the community	Mean standing crop (ash-free basis) g./m.^{2}	Major contributors to the standing crop
Depth: 154.5 m. (mean) Mud-bottom: mud constituted 50.09% (mean) of the sediment	Prionospio malmgreni Sternaspis fossor Ninoe gemmea Axinopsida serricata Adontorhina cyclia Macoma carlottensis Heterophoxus oculatus	3.058	Brisaster latifrons Ophiura lütkeni Amphioplus sp. Sternaspis fossor
Depth: 95.8 m. (mean) Sand-bottom: sand constituted 67.81% (mean) of the sediment	Magelona sp. Sternaspis fossor Nephthys sp. Haploscoloplos elongatus Yoldia ensifera Axinopsida serricata Paraphoxus variatus	2.533	All of the most abundant species and Macoma elimata
Depth: 36.0 m. (mean) Sand-bottom: sand constituted 96.33% (mean) of the sediment	Diastylopsis dawsoni Ampelisca macrocephala Paraphoxus obtusidens Tellina salmonea Macoma expansa Owenia fusiformis	1.398	All of the most abundant species and Nephthys sp. and Siliqua patula

[2 figures, 4 tables, 21 references] FTP

1.01 (9.16)

"Report of Fishcultural Investigations in India. Increasing Fish Production by Improved Fishcultures, Phase I.," by H. S. Swingle and D. D. Moss, 27 pp. (August 15, 1969) Order No. PB-195 906.

"Fishculture Survey Report for Ecuador. Increasing Fish Production by Improved Fishcultures," by H. S. Swingle and F. A. Pagan, 51 pp. (December 20, 1969) Order No. PB-195 907.

"Fishculture Survey Report of Colombia. Increasing Fish Production by Improved Fishcultures," by H. S. Swingle and F. A. Pagan, 69 pp. (September 1, 1970) Order No. PB-195 908.

"Report of Fishcultural Investigations in the Philippines. Increasing Fish Production by Improved Fishcultures," by H. S. Swingle and D. D. Moss, 62 pp. (August 15, 1969) Order No. PB-195 909.

"Fishculture Survey Report for Paraguay," by R. O. Smitherman and D. D. Moss, 44 pp. (September 20, 1970) Order No. PB-195 910.

"The Marine and Coastal Fisheries Stations of Thailand," by H. S. Swingle and R. O. Smitherman, 42 pp. (July 30, 1969) Order No. PB-195 911.

"Fishculture Survey Report for Panama," by R. O. Smitherman and D. D. Moss, 71 pp. (September 1, 1970) Order No. 195 912.

"The Inland Fisheries Program of Thailand. Increasing Fish Production by Improved Fishcultures," by H. S. Swingle and G. B. Pardue, R. O. Smitherman, D. D. Moss, and H. R. Schmittou, 165 pp. (January 1, 1970) Order No. PB-195 914.

"Fishculture Project Report for East Pakistan. Increasing Fish Production by Improved Fishcultures, Phase I.," by H. S. Swingle, H. R. Schmittou, D. D. Moss, and W. A. Rogers, 142 pp. (February 1, 1969) Order No. PB-195 915.

"Fishculture Survey Report for West Central Africa. Increasing Fish Production by Improved Fish Production by Improved Fishcultures," by D. D. Moss, G. B. Pardue, and M. J. Danner, 125 pp. (June 30, 1969) Order No. PB-195 916.

Reprinted in part

1.36 (9.12) A GENETIC ANALYSIS OF RECAPTURE FREQUENCIES OF RELEASED YOUNG OF SALMON (SALMO SALAR L.)

Ryman, Nils (Institute of Genetics, University of Stockholm, Box 6801, S-113 86 Stockholm, Sweden)
Hereditas 65, No. 1, 159-160 (1970)

Since almost all salmon released from hatcheries as young smolts are recaptured within the first few years after release, recapture frequency is assumed to be a measure of survival ability. The author derived an equation to express the relation between the coefficient of inbreeding and the expected recapture frequency for any inbred family relative to that for a noninbred family. He suggests that the tendency toward lower recapture frequencies in inbred families (which might be regarded as a lower probability of survival for inbred fishes) could be of importance in the breeding not only of salmon but of other hatchery-reared fish.

In a few instances, the relations between families were such that an additive genetic component of variation of recapture frequencies was indicated. Analysis of variance showed a difference between half-sib families that was statistically significant at the 2.5% level. This existence of a genetic component suggests that recapture frequency could be improved by planned genetic selection.
[1 figure, 1 table, 1 references] LB

1.0116 (1.81)(9.15)

in two waves and extended from July 4 to early in September. River mouths generally received the heaviest set. Since there has been practically no oystering in Delaware for twelve years, an experimental planting of seed on three planted beds was carried out in 1969-1970. Although all the experimental beds were not productive, one bed showed promise and indicated that with proper management Delaware oyster beds can be rehabilitated. Finally, examination of histological sections for MSX suggested that the incidence of this disease was probably always lower in the river beds than the bay beds. The incidence of MSX in the bay beds was not as high as it was in the mid-1960's.
[1 figure, 7 tables, 31 references] Reprinted in part

1.0118 A DISTRIBUTIONAL STUDY OF MISSOURI FISHES

Pflueger, William L.
Published by University of Kansas Publications, Museum of Natural History, Lawrence, Kans. (1971), pp. 225-570.

This report summarizes current knowledge on the distribution of Missouri fishes and interprets the distribution patterns in terms of the environmental conditions and historical events that have determined their development.
[15 figures, 193 maps] FTP

1.0148 COMMENT - IBERIA'S CONTRIBUTION TO EUROPEAN FISHERIES

Noel, H. S.
World Fishing 19, No. 10, 9ff. (October 1970)

This editorial is, in effect, an introduction to the 11 articles that follow. It points out that Spain is the third largest producer of fish in Western Europe, has one of the highest per capita levels of fish consumption in Europe, and operates the largest and finest freezer fleet in Western Europe. It then gives figures for both Spain's and Portugal's landed tonnage, fishing fleet, and imports and exports, and touches on both governments' plans for developing their industry.

The articles that follow give a detailed picture of various aspects of the Spanish fishing industry. They are -

"Pescanova Success Story" (pp. 11-12). A description of the facilities, products, and growth of Spain's largest deep-sea fishing company. [5 photographs]

"Products from Iberia" (p. 13). Europe's largest fish cannery; expansion of a shipyard into shellfish processing, fish canning, and advance research on packaging, wrappers, consumer preferences, and export markets. [2 photographs]

"Spanish Deck Gear Wins Export Markets" (pp. 14, 17). Competitively priced, high-quality hydraulic equipment--winches, cranes, power blocks, booms, fish pumps--and even small boats. [8 figures]

"50 Years of Radio Sales and Service" (p. 17). Maintenance and inspection service for the Spanish fleet in 400 of the world's main ports.

"Exporters of Synthetic Fibres" (pp. 18, 25). Competitive prices, consistent quality, and an aggressive attack on export markets, an account of the success of three Iberian manufacturers of synthetic rope, net, twine, floats, bristles (for brushes), and lifejackets. [4 photographs] (over)

1.3 (9.2)(2.1475) PROBLEMS OF OVER-EXPANSION IN THE SALMON FLEET PART TWO - SEINERS

Campbell, Blake A. (Economics Branch, Fisheries Service, Pacific Region [Canada])
Western Fisheries 81, No. 2, 22, 24, 26, 28, 59 (November 1970)

In Part I [Commercial Fisheries Abstracts 24, No. 3, 7 (October 1970)] of this series, the author examined the status of the salmon trolling fishery and reviewed its trends and problems over the past 20 years. In Part II, he examines the salmon purse-seine fishery during the same time period.

Whereas production and value of salmon landings reported by salmon trollers have increased markedly since 1951, those reported by salmon purse seiners have declined. And whereas production by trollers has been fairly consistent over the years, seine production has fluctuated sharply from year to year. From 1966 to 1969, total salmon production was 17% less than from 1951 to 1955, but salmon seine production was 35% lower. This decline is due primarily to reduction in stocks of chum salmon during the period and to the competitive pressure exerted by the increasingly larger, more efficient trollers and gill-netters. Between 1951-55 and 1966-69, the average unit price for seine-caught salmon increased by between 24% (for springs) and 89% (for coho); yet the average annual value of seine-caught salmon increased by only 14%.

In 1951-55, the average annual value of the salmon seine fleet was $11.7 million; in 1966-69, it was $17.2 million, an increase of 47%. Because of the fluctuating numbers and values of the vessels operating as salmon seiners--a fluctuation attributed to the versatility of the large combination vessels that fish for salmon during the good years and then return to other fisheries when salmon prospects are not so favorable--the number of operating salmon seine vessels does not reflect the capability of the fleet. (over)

1.3 (9.2)(2.1476) PROBLEMS OF OVER-EXPANSION IN THE SALMON FLEET PART THREE - GILLNETTERS

Campbell, Blake A. (Economics Branch, Fisheries Service, Pacific Region [Canada])
Western Fisheries 81, No. 4, 15-16, 18, 20, 22, 24 (January 1971)

This final section of the series of articles on overcapitalization of the salmon-fishing industry deals primarily with the gill net fishery; however, it also examines vessel ownership and the amount of indebtedness in the entire primary fishing sector of the industry.

Gillnetting, which has always been the backbone of the British Columbian salmon industry, is usually a one-man operation. Gill net boats range in length from 20 to 40 ft. and are valued at between $500 and $40,000. Four general types of fishermen operate the salmon gill net fishery: (1) those who derive their total income from gillnetting, who start fishing spring salmon early in the year and follow the salmon runs to different areas of the coast; (2) those who fish only in local areas from small skiffs, supplementing their income from logging, trapping, or farming; (3) those who derive their major income from salmon gillnetting but convert to trolling, shrimp trawling, halibut longlining, or cod fishing during the salmon off-season; and (4) those who only gillnet for salmon but do not start fishing until June. The vessels these fishermen operate are (1) owned by companies and rented or chartered to the fishermen, (2) registered in the name of a company but are being sold to the fishermen, or (3) owned by individual fishermen. A high percentage of the total number of fishermen are either Indian or Japanese.

Although the salmon gill net fishing season extends from February to November, most gillnetters fish only the major sockeye, pink, coho, and early chum runs--from late June till the middle of September. In 1968-69, for example, 85% of the gill

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1.4 ANALYSES OF THE SEBASTES ALEUTIANUS-S. MELANOSTOMUS COMPLEX, AND DESCRIPTION OF A NEW SCORPAENID SPECIES, SEBASTES CAENAEMATICUS, IN THE NORTHEAST PACIFIC OCEAN

Tsuyuki, H., and S. J. Westrheim (Fisheries Research Board of Canada, Vancouver Laboratory, Vancouver 8, British Columbia)
Journal of the Fisheries Research Board of Canada 27, No. 12, 2233-2254 (December 1970)

In this report, the authors describe the results of detailed electrophoretic and morphological examinations of specimens of rockfishes of the aleutianus variants collected during 1968-69 off the coast of British Columbia, Canada, and of S. melanostomus collected off Monterey, California. Museum specimens of Sebastes swifti, S. introniger, and S. aleutianus were also examined (for comparative purposes). These taxonomic studies of the S. aleutianus-S. melanostomus complex (formerly Scorpaenidae) resulted in the identification and description of the new species, S. caenaematicus, whose range is known to be from Cape Flattery, Washington, to Cape Ommaney, Alaska. The report also includes a synonymy and literature history for the complex.
[7 figures, 7 tables, 28 references, and an Appendix with 2 tables] FTP

1.3 (9.2)(2.1475)

Of the 400-odd seiners operating in the salmon fishery each year, about half are owned by fishing companies. Most of the independently owned other half are chartered to companies on a specified per diem basis. Crew members of company-owned vessels are paid a share of the gross returns, the minimum price paid for each species of salmon being fixed by negotiations between the company and the fishermen's unions. Adding in all the costs associated with seine operations (costs that the fishing companies as either owners or charterers must pay) increases the actual value of seine-caught salmon appreciably.

Most salmon caught by seiners is canned. The author sees no reason for this, suggesting that seiners must consider ways of improving their handling procedures so the quality of their catch can be used on the fresh or the frozen market, where it will command higher unit prices. He notes that although company-owned or -chartered seiners have provided an assured supply of salmon to processors in the past, the time is fast approaching when the actual unit cost of seine-caught fish must be considered. If it is higher than that for salmon caught by other gear, seiners that cannot produce salmon on a competitive cost basis will probably be eliminated. Yet management will create other difficulties if the salmon seine fleet is reduced appreciably. A reduced fleet would be unable to handle the large runs that occur during certain years, nor could it be deployed to give the proper distribution of the fleet between good and poor areas of production. Staggering weekly fishing times between high production areas or working out some type of pooling arrangement between the seiners might be a way of solving the problem.
[1 figure, 5 tables, 6 graphs] LB

1.87 (9.12) MOVEMENTS OF TAGGED AMERICAN LOBSTERS, HOMARUS AMERICANUS, LIBERATED OFF CAPE COD, MASSACHUSETTS

Morrissey, Thomas D. (Department of Natural Resources, Division of Marine Fisheries, Sandwich, Mass. 02563)
Transactions of the American Fisheries Society 100, No. 1, 117-120 (January 1971)

The American lobster, Homarus americanus Milne-Edwards, is generally considered to be non-migratory (Cooper, 1970; Montreuil, 1954; Templeman, 1935, 1940; Wilder, 1947, 1953, 1963; Wilder and Murray, 1956, 1958), remaining within an area with a radius of 3-5 kilometers.

A tagging study of 350 egg bearing lobsters in 1964 at Orleans, Massachusetts suggested substantial movement in a northerly direction. Average movement of 39 (11%) recaptures was 30.2 km. To verify this movement, the author conducted a second study in 1965 in which 47 tags (15%) were returned. Mean time at large was 39 days and mean distance traveled was 26.1 km. Thirty-eight percent of the recoveries moved less than 10 km, 21% moved between 10 and 30 km, and 41% exceeded 30 km. Results obtained in 1965 corroborated the northerly movement indicated in 1964. [1 figure, 2 tables, 13 references] Reprinted in part

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1.92 (9.13) DYNAMICS OF ZINC CONTENTS IN CARP AT EARLY STAGES OF ITS DEVELOPMENT

Sabodash, V. M. (Inst. Hydrobiol., Kiev, U.S.S.R.)
Chemical Abstracts 73, No. 25, 128276u (December 21, 1970)

1.0148

"Vigo--Top Catching & Building Port of Spain" (pp. 20-22, 24). Vigo, the first port of Spain and the major fishing port of Europe; a note concerning the shipyards in 15 other Spanish ports. [9 photographs, 2 figures, 2 tables]

"How Spain's Fleet May Evolve" (p. 25). Comments by the managing director of Astilleros Construcciones, one of Vigo's shipyards, on the type of vessel that should be designed for the future and the efficiency and needs of the pelagic fishery.

"Sener's Ship Design Service" (p. 26) A comprehensive consulting and design service for shipbuilders and chemical and petrochemical engineers. [2 figures]

"100 Companies Supply Marine Equipment" (p. 26) All the facets of labor that account for the total cost of a vessel.

"Training Spanish Fishermen" (pp. 28-29). The Admiral Nieto Antunez nautical school, opened in 1966 in Vigo, for almost exclusive instruction in fisheries. [11 photographs]

"Cleansing 200 Tons of Mussels a Day" (pp. 30, 32-33). One of the largest concentrations of farmed mussels in the world; located in the rias and fjords of Galicia, which produces 150,000 tons a year; a description of the culturing and harvesting techniques, plant and water facilities, and maintenance costs. [10 photographs] LB

2.3 (2.06)(2.8) TREATMENT OF FISH FOR USE AS FOOD

Haarmann und Reimer G.m.b.H. (pat.)
French Demande 2,008,279 (Jan. 16, 1970)
Chemical Abstracts 74, No. 3, 12027e (January 18, 1971)

1.3 (9.2)(2.1476)

net salmon was caught between July and September. Taking closed periods into account, actual fishing time averages only 30 or 35 days, just 10% of the year. The author considers capital utilization for so short a time difficult to justify. Unless the vessel can be used in some other fishery, the fisherman who operates it must consider himself a part-time fisherman only and should look to some other source of income, he says.

This series of articles raises one gnawing question: Why do men continue to fish for salmon in British Columbia? Some of the reasons are that a very small percentage (less than 5%) of hard-working, experienced fishermen earn an excellent living year after year in the salmon fishery. Some men are trained for no other kind of work. Some men value the independence of the fishing life more highly than they do the economic returns it provides. Many newcomers get into the fishing business because the salmon fishery has been overglamorized and the profits have been overstated; the turnover in this group is about 20% a year. Some retired people use salmon trolling to supplement their income. Overlying all these reasons is the fact that before 1968 license fees were nominal and entry into the salmon fishing industry was unrestricted. The Salmon Licence Control Program has changed both these conditions--the higher license fees and the difficulty of acquiring a vessel are designed to discourage the casual fisherman.

The Canadian Department of Fisheries and Forestry is preparing a special pamphlet to help fishermen understand what they can expect in the way of returns from their own fishing operation. It is available from the Department's office at 1155 Robson Street, Vancouver 5, British Columbia, Canada.
[2 figures, 6 tables] LB

1.89 (9.125)(2.113) REPAIR AND REATTACHMENT IN THE BALANIDAE AS RELATED TO THEIR CEMENTING MECHANISM

Saroyan, J. R., E. Lindner, and C. A. Dooley (Mare Island Naval Shipyard, Vallejo, Calif. 94592)
Biological Bulletin 39, No. 2, 333-350 (October 1970)

The authors' primary object was to collect, analyze, and test the adhesive secretion of barnacles (Balanus sp.) as an aid to future solution of fouling problems. Their observation that detached or injured barnacles produce a secondary cementlike secretion motivated them to study the anatomy and the function of the cementing organs as a first step toward determination of the nature of this healing secretion. They found that the secondary secretion has a looser, more cavernous structure than the primary cement has, but the secondary cement can successfully reattach the barnacle to a new substratum. Although some barnacles can develop new cement ducts, they generally use the primary duct network to secrete secondary cement. This use is possible because most of the once-used ducts are not plugged by hardened cement, despite the fact that the cement can, and probably does, harden inside the ducts. A unique flushing mechanism keeps the ducts open and ready for reuse: a nonhardening flushing fluid forces the still-liquid cement out of the ducts; the cement hardens outside the duct openings, sealing the flushing fluid inside; when the barnacle is detached or injured, the cement seal breaks and the flushing fluid drains out, leaving the duct open for the secondary secretion. [22 figures, 25 references] LB

2.00 (3.331) ACCURACY OF PREDICTING OCCURRENCE OF GREENING IN TUNA BASED ON CONTENT OF TRIMETHYLAMINE OXIDE

Yamagata, M., K. Horimoto, and C. Nagaoka (Japan Frozen Foods Inspection Corporation, Tokyo 100, Japan)
Journal of Food Science 36, No. 1, 55-57 (January-February 1971)

Sometimes the meat of tuna will turn varying degrees of green after the fish are cooked. The level of trimethylamine oxide (TMAO) in the raw meat may be used as a guide in predicting whether the raw tuna will turn green after cooking. TMAO is involved in the greening of tuna. In this study, the researchers tried to determine (1) the most suitable portions of the muscle of the fish to sample and (2) the lowest level of TMAO and TTMA (total trimethyl amine) in the raw meat that would be useful for predicting the development of green tuna.

Samples of yellowfin tuna that were iced and samples that were frozen aboard ship were obtained. Both sets of samples were held at -25° C. in a commercial cold-storage warehouse prior to use in the experiments. Samples of meat were taken from three different locations on the fish: at the dorsal section, at the ventral section, and near the tail fin.

The authors found that greening of tuna can be predicted from the level of TTMA in the sample of muscle taken from the dorsal section of the fish. They further state "The lowest level of TMAO-N was 8-9 mg.%, and that of TTMA-N was 11-12 mg.% in an iced and 9 mg.% in a clipper-frozen green tuna. The predictive measurement accuracy was 96% on the lowest level of TMAO-N or TTMA-N." ("N" is nitrogen.). [1 figure, 3 tables, 5 references] FTP

2.00 (0.36) (3.331) PREMORTEM STRESS AND POSTMORTEM BIOCHEMICAL CHANGES IN SKIPJACK TUNA AND THEIR RELATION TO QUALITY OF THE CANNED PRODUCT

Crawford, Ladell, and Enid J. Irwin (Bureau of Commercial Fisheries Technological Laboratory, Terminal Island, Calif. 90731), and John Spinelli (Bureau of Comm. ercial Fisheries Technological Laboratory, Seattle, Wash. 98102), and W. D. Brown (Institute of Marine Resources, University of California, Berkeley, Calif. 94720)
Journal of Food Science 35, No. 6, 849-851 (November-December 1970)

Processors of canned tuna have noted that the quality of the fish caught in seines is more variable than that of fish caught by pole-and-lines (live bait and pole fishing). The purpose of this study was to determine the effect of stress imposed on the live fish on certain biochemical conditions of the fish post mortem, and the relation of the stress and biochemical changes to the quality of the canned product.

Live skipjack tuna were held in tanks shoreside for 24-48 hours. After this period some of them were exercised to simulate the stress they would experience during commercial capture; they were then killed and held at 74° or 32° F. for 6 hours. The fish were canned in the usual manner. Control samples of canned tuna were prepared from fish that had not been experimentally subjected to stress conditions. The chemical analyses of the raw tuna tissue were for glucose, glucose phosphate, fructose phosphate, total reducing sugars, lactate value, pyruvatevalue, and nicotinamide adenine dinucleotide (NAD). The canned tuna were examined for color, flavor, odor, flakiness, firmness, fibers, and scorch.

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2.01 (0.5) EFFECT OF MICROBIAL GROWTH UPON SARCOPLASMIC AND UREA-SOLUBLE PROTEINS FROM MUSCLE

Hasegawa, Tadao, A. M. Pearson, J. F. Price, J. H. Rampton, and R. V. Lechovich (Department of Food Science, Michigan State University, East Lansing, Mich. 48823)
Journal of Food Science 35, No. 6, 720-724 (November-December 1970)

The mechanism of degradation and the extent of muscle protein involvement in bacterial spoilage of meat have not been elucidated. The purpose of this study, therefore, was to determine the extent and nature of changes in the sarcoplasmic proteins from skeletal muscle resulting from bacterial growth. Aseptically removed muscle from the rabbit and from the pig were inoculated with several specific organisms and the changes in the sarcoplasmic proteins were examined using starch gel and disc gel electrophoresis after the samples had been incubated at 10° C. for 8 and for 20 days. The control samples were prepared in the same way as the test samples, except they were not inoculated with the test microorganisms. The four microorganisms used had widely different properties but were those commonly found on various meat products.

The results indicated that different microorganisms preferentially used specific proteins. Pseudomonas fragi demonstrated the greatest amount of proteolytic activity on the sarcoplasmic fraction and caused extensive breakdown in the rabbit and in the porcine muscle. Leuconostoc mesenteroides altered extensively the sarcoplasmic proteins of rabbit muscle but did not have as much effect on the porcine

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2.00 (0.36)(3.331)

The researchers found that there was no overwhelming evidence connecting experimentally applied stress on live tuna or temperature of holding fresh tuna with the quality of the canned fish. It is possible, however, that the stress conditions imposed upon the fish commercially are greater than those applied in these experiments, or that factors other than stress or temperatures are of importance in determining quality of the canned tuna product.
[2 tables, 11 references] FTP

2.01 (0.5)

muscle. Pediococcus cerevisiae caused extensive alteration in the sarcoplasmic proteins of rabbit muscle but had no effect on pig muscle. Micrococcus luteus caused only minor breakdown of the sarcoplasmic proteins of rabbit muscle and showed no action on porcine muscle. Pseudomonas fragi and Pediococcus cerevisiae produced considerable breakdown of the urea-soluble proteins in pig muscle but had less effect on rabbit muscle. M. luteus and L. mesenteroides did not exert any measurable proteolytic effect on the urea-soluble proteins.

The authors suggest that the proteolytic activity of different microorganisms is quite specific depending upon the type and properties of the enzymes produced by each. This further suggests that meat spoilage is a highly complex process involving various microorganisms that produce highly specific enzymes, which enzymes preferentially act upon only certain proteins or enzymes indigenous to muscle. If we understood more completely the specificity of enzyme activity of meat spoilage microorganisms, we would be in a better position to develop methods for inhibiting or preventing microbiological spoilage of meat.
[3 figures, 4 tables, 15 references] FTP

2.02 (0.36) AMMONIA PRODUCTION IN MUSCLE: THE PURINE NUCLEOTIDE CYCLE

Lowenstein, John, and Keith Tornheim (Graduate Department of Biochemistry, Brandeis University, Waltham, Mass. 02154)
Science 171, No. 3969, 397-400 (January 29, 1971)

Ammonia is produced when work is done by muscle. In this article, the authors describe experiments that throw new light on the problem of ammonia production by muscle and, probably, by other tissues. FTP
[4 figures, 1 table, 25 references]

2.08 (2.114) FISH COOLING AND PRESERVING SYSTEM

U.S. Patent 3,552,143
Johnson, David Lee; Marion Luther Dodson, Waveland, Miss. (pat.)

Fish or meat is cooled by the gas from evaporating liquid nitrogen. The foods are contained in a wire mesh basket which is placed in a box. Gaseous nitrogen is supplied to the box where it is maintained at above atmospheric pressure. The inventor claims that the equipment and method is adaptable to operation aboard fishing vessels. FTP

1.9 (8.59)(9.3) GENETIC VARIATION IN THE EEL. II. TRANSFERRINS, HAEMOGLOBINS AND ESTERASES IN THE EASTERN NORTH ATLANTIC. POSSIBLE INTERPRETATIONS OF PHENOTYPIC FREQUENCY DIFFERENCES

Pantelouris, E. M. (Biology Department, University of Strathclyde, Glasgow, C.1, Scotland), A. Arnason (Natturfraedistofnum, Islands, P.O. Box 532, Reykjavik, Iceland), and F. W. Tesch (Biologische Anstalt Helgoland, Hamburg, Germany)
Genetical Research 16, No. 3, 277-284 (December 1970)

In a series of studies, the authors are attempting to solve the "Atlantic eel problem," specifically, whether European eels do in fact spawn in the Sargasso Sea and whether they interbreed there with American eels. In the first report of the series (published in 1968), they introduced an improved technique for resolving hemoglobin types by electrophoresis and demonstrated that the eels' esterase patterns vary. In the present report, they compare hemoglobins, serum proteins, and liver esterases of 337 yellow, brown, and silver eels caught in Iceland, Western Scotland, and Germany.

The findings confirmed the uniformity in hemoglobin types reported in 1968--all 337 specimens showed the four electrophoretic fractions described then. The liver esterases of eels caught in Germany showed significant differences in the frequencies of phenotypes in the fast zone of the electropherogram from those of eels caught in Iceland and Scotland. The frequencies of transferrin phenotypes in eels caught in Iceland and Scotland were significantly different from those caught in France and America. These apparent regional differences in gene frequencies may reflect subdivisions of populations of the European eel; or they may be due to differential selection acting on one population of elvers as it fans out toward the Continent. The implications for the Atlantic eel problem are complex; the authors examine the complexities.
[4 tables, 10 plates, 17 references] LB

2.05 (0.4) BOTULISM AMONG CAPE DORSET ESKIMOS AND SUSPECTED BOTULISM AT FROBISHER BAY AND WAKEHAM BAY

Stuart, P. F. (Montreal General Hospital, Montreal, Canada), E. J. Wiebe, R. McElroy, Douglas G. Cameron, E. C. D. Todd, I. E. Erdman, B. Albalas, and Hilliard Pivnick
Canadian Journal of Public Health 61, No. 6, 509-517 (November-December 1970)

Outbreaks of botulism due to Clostridium botulinum type E occur over 500 times more frequently per capita among Eskimos than among any other peoples of North America except, possibly, the Indians of the Northwest Pacific coast. The aged, uncooked meat of seal, walrus, and whale that the Eskimos traditionally eat is the carrier of the toxin. This article discusses the barriers to an educational program designed to persuade the Eskimos to cook their meat as a means of preventing such outbreaks--long-standing dietary habits, a shortage of fuel in some areas, the primitive conditions under which hunting parties operate, the necessity to take meat in times of plenty and hold it at temperatures not low enough to prevent the growth of C. botulinum. And it strongly recommends initiation of an immunization program in which toxoid rather than antitoxin is used--despite the difficulties of communication and transportation in the Arctic.
[4 tables, 26 references] LB

2.3 CRABMEAT EXTRACTION METHOD

U.S. Patent 3,548,449
Lockerby, W. Lee; Avico Inc., Houston, Tex. (pat.)

The machine extracts the meat from the body shells of crabs by means of centrifugal force. FTP

2.117 THE SUPER SEINER

Anonymous
Fish Boat 16, No. 2, 13-16, 33 (February 1971)

When the last of a new breed of tuna seiners is delivered early in 1972, these fast, high-capacity vessels will make up more than 10% of the U.S. tuna fleet. The first three built are 176 ft. long, have a sea speed of 14.5 knots when fully loaded (16 knots when light), are powered by 2,600-hp. 16-cylinder diesel engines, and have a fish capacity of 650 tons. These boats were partially funded by the U.S. Government. The remaining 12 are privately funded.

The design of the second three vessels was "stretched," giving them an overall length of 183 ft. and a fish capacity of 750 tons. Using the same engine as the first three, these vessels have a fully loaded sea speed of 15.5 knots. They represent an intermediate step in the evolution of this new seiner class. Following construction of the seventh vessel (the Quo Vadis 202 ft. long, 3,100 hp. 16 cylinder engine, 16 knots fully loaded sea speed, 1,100-ton fish capacity), the design was stretched even more. The final eight vessels, which are scheduled to be on the fishing grounds by early 1972, will be 214 ft. long and will have 3,600-hp. either 18- or 20-cycle engines, a fully loaded sea speed of 16 knots, a 16-man crew, and a fish capacity of 1,100 tons.

Although the new seiners are conventionally hulled, their design is subtly sophisticated. They achieve high speed through a fine entry bow that permits top cruise speed at nearly full load; a stern designed to recapture some of the energy spent in achieving forward motion, redirecting it to propulsive thrust; and a between-deck, cross-beam flume system that continuously ballasts the vessel against

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3.19 (9.6) DISINFECTION

Benarde, Melvin A. (ed.) (Department of Community Medicine, Hahnemann Medical College and Hospital, Philadelphia, Pa.)
Published by Marcel Dekker, Inc., 95 Madison Ave., New York, N.Y. 10016 (1970), 466 pp. illus., $24.50
Reviewed by James G. Shaffer (The Chicago Medical School, Chicago, Ill. 60612)
American Journal of Tropical Medicine and Hygiene 20, No. 1, 163-164 (January 1971)

The various chapters in this book were contributed by engineers, microbiologists, food scientists, and administrators or managers from the universities, industrial firms, and government agencies of six different countries. The object was to present the mechanism for an approach to the scientific development and use of disinfectants as well as to record the various practices and needs of different types of institutions under various structural and ecologic conditions.

The first three chapters deal, respectively, with the metabolism of microorganisms, the mechanism of disinfection, and the kinetics of disinfection; the next two with the special problems posed by spores and viruses. The following chapters have an extensive treatment of gaseous disinfection and a specific discussion of disinfection practices in hospitals; dairies; and food processing, seafood, and beverage industries. LB

2.149 (9.12) ATTRACTION OF COASTAL PELAGIC FISHES WITH ARTIFICIAL STRUCTURES

Klima, Edward F., and Donald A. Wickham (National Marine Fisheries Service, Exploratory Fishing and Gear Research Base, Pascagoula, Miss. 39567)
Transactions of the American Fisheries Society 100, No. 1, 86-99 (January 1971)

Artificial structures positioned off Panama City, Florida, during July 1969 proved effective in attracting commercial quantities of round scad, Spanish sardines, and scaled sardines.

The structures' position in the water column and their design were important in attracting fish. Midwater structures which resembled a small pup tent were effective in attracting up to 25 metric tons of fish and consistently attracted from ½ to 5 metric tons daily. SCUBA divers made visual estimates of the number of each species present at the structures...[The authors] discuss the behavior of the fish and present a possible explanation of why fish are associated with submerged structures.

This study indicates that artificial structures are very effective in concentrating coastal pelagic fishes in the Gulf of Mexico. Commercial quantities, estimated at up to 25 metric tons were attracted to a structure on one occasion, and on six others at least 5 metric tons of fish were attracted during the 20-day study. Of the 56 observations made, ½ metric ton of bait fish or more was observed 15 times. Jacks were attracted in fewer numbers although on one occasion 500 individuals were estimated to be in association with a structure.

The rate of initial attracting was very rapid, indicating that fish could be harvested at frequent intervals. Attraction appeared to be dependent upon the visibility of the structure. Simple structures were more visible than complex ones

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3.29 (3.1) AVAILABILITY OF AMINO ACIDS IN SARCOPLASMIC FISH PROTEINS COMPLEXED WITH SODIUM HEXAMETAPHOSPHATE

Pelroy, Gretchen A., and John Spinelli (National Marine Fisheries Service, Seattle, Wash. 98102)
Journal of Food Science 36, No. 1, 144-146 (January-February 1971)

Condensed phosphates are used in foods to improve the quality of the food products; for example, they increase the water-holding capacity of frozen and thawed fish and they improve the foaming capacity and foam stability of egg albumin. Apparently, the phosphates react with the protein of the food to form protein-phosphate complexes. Although considerable work has been performed on the utility and chemistry of the reaction, additional information is needed on the nutritional characteristics of the protein-phosphate complexes. In this paper, the authors report on the comparison of the availability (by enzyme digestion) of four amino acids (lysine, methionine, tryptophan, and threonine) in sarcoplasmic fish proteins and the sarcoplasmic fish proteins complexed with sodium hexametaphosphate. The sarcoplasmic proteins were obtained from the rockfish (Sebastodes melanops). The protein complexes were prepared by reacting 1% solutions of the sarcoplasmic fish protein at pH values of 2, 3, 3.5, and 4 with hexametaphosphate at concentrations of 0.005, 0.01, 0.02, and 0.05 M. A control sample of sarcoplasmic protein was prepared by precipitating the sarcoplasmic protein from solution with 70% isopropanol. The availability of the amino acids in the samples was assessed by an enzyme-digestion method adapted from the work of J. E. Ford and D. N. Salter [British Journal of Nutrition 20, 843 (1966)].

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2.149 (9.12)

and consistently had larger concentrations of bait fish and jacks associated with them. A structure's vertical position had some effect on the number of fish attracted. Bait fish showed a preference for midwater structures but jacks preferred surface structures. Further study is required to determine the significance of a structure's vertical position and whether improving its visibility by changing size, color, or design would increase its attraction and holding ability.

The results of this study indicate that artificial structures could accumulate coastal pelagic species, a technique that could be incorporated into a commercial harvesting system for this undeveloped aquatic resource in the Gulf of Mexico as well as in other parts of the world.

[13 figures, 2 tables, 5 references] Reprinted in part

[6 figures, 5 references] LB

due not only to mechanical influences but to biological ones as well.

amination to be deterioration of the surface of the filament--deterioration that time of use increases. The reason for the decrease is shown by microscopic examides (PA). The efficiency of fishing gear made of PA monofilaments decreases as microorganisms can cause changes in the properties of synthetics, including polyattributed to nonbiological influences. However, investigations have shown that attack, gradual decreases in strength of nets made of synthetic fibers have been

Since synthetic plastics have been assumed to be fully resistant to biological

Von Brandt, von A. (Institut für Fangtechnik der Bundesforschungsanstalt für Fischerei, Hamburg, Germany)
Archiv für Fischereiwissenschaft 21, No. 3, 232-237 (1970) (In German; English summary) (H. Heenemann G.m.b.H., 1 Berlin 42, Besseemerstrasse 83, Germany)

2.1113 MIKROBIELLE SCHÄDIGUNG BEI MONOFIL-NETZEN
[MICROBIAL DAMAGE TO MONOFILAMENT NETS]

3.29 (3.1)

The availability of the amino acids in the sarcoplasmic fish proteins (non-complexed control) was not significantly different from that of the sarcoplasmic proteins complexed with sodium hexametaphosphate. Nearly 100% availability of the methionine, threonine, and tryptophan, and nearly 85% availability of the lysine were found in the samples (the samples had been dried at 75° C.). When the samples were heated at 100° C. in a closed atmosphere (containing an equal weight of water to the sample) for 24 hr. the availability of lysine in the samples was 35%, methionine was 22%, tryptophan was 39%, and threonine was 34%. The authors concluded that complexing sarcoplasmic fish proteins with sodium hexametaphosphate does not impair the nutritive value of the complexed protein.

[2 figures, 21 references] FTP

Power, Henry E., Margaret L. Morton, and Ruth E. Sinclair (Technol. Res. Lab., Fish. Res. Board of Canada, Halifax, Nova Scotia)
Chemical Abstracts 74, No. 1, 2786n (January 4, 1971)

3.2490 CHEMICAL AND PHYSICAL CHARACTERISTICS OF COD STORED (1.51) AT SUPERCHILL TEMPERATURES

2.117

roll, giving it outstanding sea-keeping stability. The increase in power, speed, capacity, and length has not been attained at the expense of range and fuel economy. Up till now, even the most efficient tuna boats burned about 10.5 gallons per mile at top speed fully, or nearly fully, loaded. The Quo Vadis averages about 9.4 g.p.m. and the newer, longer, more powerful vessels test out at between 8.75 and 9 g.p.m. The design supervisor accounts for this apparent anomaly as follows: the fine entry bow, which is responsible for the seiner's speed and performance, needs length to deliver top design performance, so adding length and power actually increases the vessel's performance. So does the class' vibration-reducing, oil-pressurized stern tube, in which the shaft is immersed in oil (rather than in the conventional water) just before it connects to the propeller.

The main seine winch of the latest super seiners will be reversing and infinitely variable through the entire speed range. The vessels will have $57,000 worth of navigational electronics (the Quo Vadis and her predecessors have $47,000 worth), including a second 64-mile radar, an Omega navigation system that automatically fixes the seiner's position relative to the fishing area, an automatic sextant to back up the gyro automatic pilot and the magnetic automatic pilot, and a top-mast-mounted V-antenna for increasing the single sideband range of the radiotelephones. This last piece of equipment permits the vessel to make immediate direct contact with American Tuna Boat Association headquarters in San Diego from fishing grounds along the African coast.

At the time this article was written, the 1971 quota season had just begun. Among the first vessels into quota waters (off Central and South America) were the new super seiners. The question now that is of more than casual interest to the American tuna fleet is: Will the super seiners' performance justify their nickname? [5 figures, 1 table] LB

3.235 "KABAYAKI" -- THE EEL DISH THAT'S GOOD FOR NEW ZEALAND
(1.9)(9.16)

Anonymous
Commercial Fishing 9, No. 12, 11 (December 1970)

The Japanese eat between 26,000 and 28,000 metric tons of eel a year, most of it in the form of kabayaki. (Kabayaki is made of split, boned, steamed eels that are broiled on skewers while being frequently basted with a thick sauce made of soy, sugar, and a sweet rice wine.) Not too long ago, kabayaki was available only in restaurants employing cooks skilled in its preparation; but recent technical developments have made its production in factories possible. There it is cooked, vacuum sealed in polythene bags, frozen, and distributed to supermarkets or department stores for sale. The housewife has only to remove it from the wrapper, warm it, and serve it on hot boiled rice.

The largest of the Japanese kabayaki factories is in Fukuda. It consists of two live eel stores, the eel butchers' room, a skewering room, a soy sauce store, one operating broiler line (with a yearly output of 500 or 600 tons of kabayaki) and space for a second, a packaging section, a cartoning room, freezers, and cold stores. Since all the kabayaki plants are managed by eel farmers, the general manager of New Zealand's Fishing Industry Board visited the Federation of Japan Eel Breeders Cooperatives and reached an agreement beneficial to the industries of both nations. The New Zealand eel industry is to supply from 3 to 5 tons of live baby eels to the Federation for low-cost testing, and the Federation is to supply the New Zealand eel industry with experts and technical information on the cultivation of eels and to facilitate the import into Japan of both wild and cultivated New Zealand eels. If the eel-growing trials in Japan are successful, the eel export industry can become an adjunct of New Zealand's developing eel-farming industry.

[1 photograph] LB

3.333 APPROACHES TO THE DIRECT PIGMENTATION OF CANNED SALMON: SYNTHESIS AND PROPERTIES OF 4,4′-BIS(PYRIDINIUMMETHYL-CARBONYLHYDRAZINO)CANTHAXANTHINDIYLIDENE DICHLORIDE

Peters, M. D., and R. J. Bose (Fisheries Research Board of Canada, Vancouver Laboratory, Vancouver 8, British Columbia)
Journal of the Fisheries Research Board of Canada 27, No. 12, 2179-2184 (December 1970)

The red color of salmon muscle arises from the presence of all trans and mono-cis-astaxanthin and astacene. The color of salmon of the same species is inconsistent and a device has been developed for the direct in-line sorting of canned salmon [P. J. Schmidt and R. M. Cuthbert, Food Technology 23, 98 (1969)]. This device makes possible color correction, provided a suitable color additive is available. This paper describes the synthesis of and the properties of a coloring agent [4,4′-bis(pyridiniummethylcarbonylhydrazino)canthaxanthindiylidene dichloride]. In preliminary attempts at pigmenting canned salmon with the compound, researcher P. J. Schmidt (in a personal communication to the authors) found that the compound gave a favorable uniform coloration to the surface of the tissue without detectable pigmentation of the free-floating oil.
[3 figures, 14 references] FTP

3.5 (1.013)(7.7) CALIDAD DEL PESCADO SALADO Y SECADO EN VENEZUELA [QUALITY OF FISH SALTED AND DRIED IN VENEZUELA]

Tornes, E., P. George, and E. M. de del Gallo
Informe Técnico No. 18 (Venezuelan Fisheries Research and Development Project), 16 pp. (1970) (In Spanish; English summary)

About 20% of all the fish landed in Venezuela is salted and sun dried, for this is the only preservation method available to the people in many fishing villages. To determine whether or not procedures and standards should be established to ensure a quality product, the authors bought 27 samples of salted dried fish, representing 17 fish species, in the markets of Caracas and examined them for salt and water content and for bacterial count. All the samples had a water content of over 40% (the maximum permissible in a quality product), and five had over 50%; the average was 47%. Two samples had too little salt to produce the 75% water saturation considered a minimum requirement; five or six had enough to produce about 75%; and some had an excess of salt. Although few of the samples were spoiled, some of those made from shark meat had an offensive ammoniacal odor and high bacterial counts. Suggestions are made for reducing the urea content in dried, salted shark meat and for improving conditions under which all the fish are processed.
[1 figure, 4 tables] LB

3.3344 EFFECT OF SOME CHEMICAL COMPOUNDS ON THE BUFFERING CAPACITY OF HORSEHAIR CRAB (ERIMACRUS ISENBECKII) MUSCLE DURING INTERMOLT STAGES

Motohiro, T., and N. Inoue (Laboratory of Marine Food Technology, Faculty of Fisheries, Hokkaido University, Hakodate, Japan)
Journal of Food Science 36, No. 1, 51-54 (January-February 1971)

In an earlier paper, I. Motohiro and N. Inoue [Food Technology 24, No. 12, 1389-1391 (December 1970)] found that abnormally high pH in canned crab meat resulted from the use of crabs after ecdysis (molting) as the raw material (the crabs after molting have a soft "paperlike" shell). The phenomenon involving pH of the meat did not occur in the canned crab meat prepared from crabs that had a hard shell. Decapods accumulate organic and inorganic reserves during their intermolt stage; the mineral reserves are primarily calcium and magnesium phosphate. Because of this, the authors reasoned that there might be differences in the buffering capacity of the crab meat during various stages in the life cycle of the animal. The purpose of the present study was to determine whether the organic and inorganic reserves in the horsehair crab at different intermolt stages affect the buffering capacity of the crab meat; particular emphasis was placed on the effect of hexosamine, amino acids, calcium, and phosphoric acid.

The intermolt stages of the crab were defined according to a classification system proposed by P. Drach [Comp. Rend. 202, 2103-2105 (1939)].

The buffering capacity of the muscle of the crab was determined as follows: The muscle was ground and then added to deionized water. The mixture was filtered. The pH of the filtrate was adjusted to pH 3.20 with 0.033 N hydrochloric acid. An
(over)

4.13 THE ALKYL MOIETIES IN WAX ESTERS AND ALKYL DIACYL GLYCEROLS OF SHARKS

Spener, Friedrich, and Helmut K. Mangold (University of Minnesota, The Hormel Institute, Austin, Minn. 55912)
Journal of Lipid Research 12, No. 1, 12-16 (January 1971)

In order to obtain information that would permit an evaluation of the metabolic interrelationship between various classes of lipids in shark livers, the authors determined the compositional analyses of the alkyl moieties in wax esters and alkyl diacyl glycerols that were isolated from the liver of the dogfish, the soupfin shark, and the silky shark. Also, they determined the relative amounts of the isomeric octadecenyl moieties in wax esters and alkyl diacyl glycerols in the liver of the sharks.

The alkyl moieties in wax esters and alkyl diacyl glycerols from the liver of dogfish, soupfin shark, and silky shark are almost exclusively saturated and monounsaturated; the main alkyl moieties were the C_{16} and C_{18} chains in both of the lipid classes.

The alkyl moieties in the wax esters occurred in a wider range of chain lengths than the alkyl moieties in the alkyl diacyl glycerols. Apparently, the enzyme system catalyzing the alkylation of the glycerol moiety is more selective than that catalyzing the formation of wax esters.

The distribution of isomeric octadecenyl moieties in wax esters and in alkyl diacyl glycerols was almost similar. Apparently, the alkyl groups in both wax esters and alkyl diacyl glycerols of sharks and other fishes are derived from long-chain alcohols. [2 tables, 34 references] FTP

3.3344

aliquot of 0.033 N barium hydroxide was added to and mixed with the filtrate. The pH of the final mixture was then determined. The rate of change of pH upon addition of increments of aliquots of the barium hydroxide solution served as a measure of the buffering capacity of the crab meat.

The calcium content of the crab muscle varied from 1.1 to 2.2 mg./g. throughout the intermolt cycle; the phosphoric acid and the hexosamine levels varied similarly to the calcium content; and the amino-acid level remained almost constant. The buffering capacity of the horsehair crab muscle varied during the intermolt stages; the buffering capacity was strong in the muscle of the crab in the paper-shell stage and weak in the muscle of the crab in the hard-shell stage. The organic and inorganic reserves apparently affected the buffering capacity of the muscle, because when these reserves were removed by repeated washing of the muscle with water the buffering capacity of the muscle became progressively weaker.
[8 figures, 1 table, 8 references] FTP

3.336 CANNED FOOD
(3.3344)

Nakayama, Masao, Toshio Naritawa, Masanori Ichigawa, and Takeshi Tsuruda (Chiyoda Chemical Industrial Co., Ltd.) (pat.)
Japanese Patent 11099/70
Chemical Abstracts 73, No. 21, 108489n (November 23, 1970)

3.4 RECOVERY OF PHENOLIC WOOD SMOKE COMPONENTS FROM SMOKED FOODS AND MODEL SYSTEMS

Issenberg, P., M. R. Kornreich, and A. O. Lustre (Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, Mass. 02139)
Journal of Food Science 36, No. 1, 107-109 (January-February 1971)

Because reliable methods for determining specific phenols in smoked food products are needed, the authors examined the feasibility of extending the methods used for identifying those components to the quantitative assessment of the components. They achieved 84% recovery of added ^{14}C-phenol from summer sausage when the sausage was extracted with 50% aqueous ethanol, followed by thorough washing of the extracted residue. During isolation and concentration of the added ^{14}C-phenol, additional losses occurred and as a result the recovery was 59% of the originally added amount. Concentrates were prepared from 5% NaOH extracts and from aqueous alcohol extracts. The concentrates prepared from the alkaline extracts contained a greater variety of substituted methoxy and dimethoxy phenols than did the concentrates prepared from the aqueous alcohol extracts (the comparison was made by gas chromatographic analysis). [4 tables, 12 references] FTP

3.4 ANTIOXIDANT AND SENSORY PROPERTIES OF CURING SMOKES OBTAINED BY THREE BASIC SMOKE GENERATION METHODS

Tilgner, D., J., and H. Daun
Lebensm.-Wiss. & Technol. 3, No. 5, 77-82 (1970)
BFMIRA Abstracts 24, No. 2, Abstract No. 532, 113 (February 1971)

Smoke was obtained by one of three processes (smouldering, friction or two-stage). All three smokes were high in antioxidant capacity. Higher phenol and acid contents were found in the smoke produced by the two-stage process. Reprinted

4.2 (4.7) MASKING UNDESIRABLE FLAVORS IN FISH OILS

Jellinek, Gisela, and Maurice E. Stansby (National Marine Fisheries Service Pioneer Research Laboratory, Seattle, Wash. 98102)
Fishery Bulletin 69, No. 1, 215-222 (January 1971) (U.S. Department of Commerce, NOAA, National Marine Fisheries Service, Publications Services Staff, 1801 North Moore St., Arlington, Va. 22209)

The odor of fish oil used medicinally may require masking by flavoring materials. During a search for suitable masking materials, fresh, specially refined menhaden oil having a minimum of flavor was stored with and without added flavoring materials for 5 days at 75° F and for longer periods at several lower temperatures. In initial preliminary screening tests with 66 different flavoring materials, the masking of rancid or other unpalatable flavors developing in the stored oil was evaluated by a small panel. In later tests, a large consumer-type panel consisting of untrained laboratory personnel was used to determine the preference for the flavors of those materials that worked best in the screening test and that were of a type approved by the U.S. Food and Drug Administration for use in foods. Several flavoring materials showed promise, particularly those having the flavor of root beer, lemon, wintergreen (methyl salicylate), and wild cherry.
[1 figure, 3 tables, 4 references] Authors' abstract

4.15 (4.14) THE COMPOSITION OF MARINE-OIL TRIGLYCERIDES AS DETERMINED BY SILVER ION-THIN-LAYER CHROMATOGRAPHY

Bottino, Nestor R. (Department of Biochemistry and Biophysics, Texas A&M University, College Station, Tex. 77843)
Journal of Lipid Research 12, No. 1, 24-30 (January 1971)

Cod-liver oil and whale-blubber oil triglycerides were fractionated according to their degree of unsaturation on silica gel thin layers with 8% silver nitrate (w/w). Under optimum conditions cod-liver oil triglycerides were separated into seven fractions; whale-oil triglycerides into six fractions.

For both oils, the saturated and monoenoic acids were abundant in their corresponding fractions and, also, comprised about two-thirds of the fatty acids in the more unsaturated fractions. Polyenoic fatty acids of similar degrees of unsaturation predominated only in the particular fraction that corresponded to their number of double bonds. The author concludes that the distribution of fatty acids of varying degrees of unsaturation among marine-oil triglycerides is not random.
[2 figures, 5 tables, 16 references] FTP

7.53 EVALUATION OF RAPID METHODS FOR THE DETERMINATION OF FAT CONTENT OF FOOD PRODUCTS

Ruez, J., et al.
Prum. Potravin 20, No. 8, 240-243 (1969)
BFMIRA Abstracts 24, No. 1, Abstract No. 13, 3 (January 1971)

"Two rapid methods, one refractometric and the other butyrometric, were found to be as reliable as the method based on the extraction of fat for determining the fat content of meat and meat products." Reprinted

4.5 (0.33)(4.6) TRAPPED RADICALS IN DRY LIPID-PROTEIN SYSTEMS UNDERGOING OXIDATION

Roubal, William T. (Pioneer Research Laboratory, National Marine Fisheries Service, Seattle, Wash. 98102)
Journal of the American Oil Chemists' Society 47, No. 4, 141-144 (April 1970)

Previous work by the author and his colleague demonstrated that unsaturated lipids in close association with proteins, enzymes, nucleotides, and amino acids (in vitro) induce polymerization of proteins, enzymes, and nucleotides, and cause destruction of amino acids. Free radicals derived from oxidizing lipids may be the dominant cause for such reactions; however, because of the low steady state concentration of radicals, no definitive electron paramagnetic resonance (EPR) study has been performed that describes such interactions. In this paper, the author reports evidence for the formation of radicals in oxidizing unsaturated lipid-protein systems low in moisture. This study showed, for the first time, that radicals derived from oxidizing lipid can be trapped in biochemical systems.

In dried biologicals containing oxidizable lipids--and regardless of the fact that trapping in a matrix reduces radical activity--radicals may react eventually. They will, therefore, participate in events leading to a variety of damaging alterations similar to the way they do in emulsion systems. In living systems, increasing evidence indicates that free radical reactions are the cause of the gradual rise in polymeric, hydrolytic enzyme-resistant lipofuscin age pigments that accumulate in organs such as the heart and the brain in man and animals. Furthermore, the author suggests that, because free radicals precede aldehydes in the oxidation of lipid, radicals are the principal causes of protein polymerization and amino acid destruction. [2 figures, 15 references] FTP

6.34 DETERMINATION BY A KINETIC METHOD OF THE NEAREST-NEIGHBOUR FREQUENCIES IN A FRAGMENT OF ALGINIC ACID

Larsen, Bjørn, Olav Smidsrød, Arne Haug, and Terence Painter (Norwegian Institute of Seaweed Research, N.T.H., Trondheim, Norway)
Acta Chemical Scandinavica 23, No. 7, 2375-2388 (1969)

An acid-soluble fragment of alginate, having a number-average degree of polymerization of 20 and containing residues of mannuronic and guluronic acid in the ratio of 1.2:1, was partially hydrolyzed at 100° C. and a pH of 2.8. Hydrolysis was characterized by two first-order rate-constants, k_M amd k_G; the ratio k_M/k_G was about 4.3. (M and G represent mannuronic acid and guluronic acid, respectively.)

At degrees of scission near 0.5, the yield of monosaccharides and of trisaccharides was lower than that calculated with the help of Kuhn's equations (and on the assumption of random cleavage); the yield of disaccharides and of tetrasaccharides was higher. On the other hand, two essentially homopolymeric fragments of alginate composed mainly of mannuronic and guluronic acid residues gave yields of monosaccharides and oligosaccharides agreeing closely with those calculated with the Kuhn equation.

The authors derived an expanded equation that permitted them to calculate the yields of mono- and oligosaccharides in terms of the k_M/k_G ratio, the degrees of scission, and the nearest-neighbor frequencies. They used this equation to analyze the data obtained on the acid-soluble fragment of alginate. Their results indicated that contiguous residues of guluronic acid are not present in the acid-soluble fragment and that the average length of the groups of contiguous residues of mannuronic acid is 1.2 units. They conclude that about 90% of the acid-soluble

6.32 (8.59) A POLYUNSATURATED HYDROCARBON (3,6,9,12,15,18-HENEICOSAHEXAENE) IN THE MARINE FOOD WEB

Blumer, M., M. M. Mullin, and R. R. L. Guillard (Woods Hole Oceanographic Institution, Mass.)
Technical Report dated April 20, 1970, Nos. WHOI-Ref-70-52, WHOI-Contrib. 2485, 13 pp.
U.S. Government Research & Development Reports 71, No. 1, 51-52 (January 10, 1971) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. AD-714 036, Reprint.

An olefinic hydrocarbon (all-cis-3,6,9,12,15,18-heneicosahexaene, 'HEH') was isolated from marine planktonic plants and animals. Its structure was established by ultraviolet, infrared and mass spectrometry in combination with chemical techniques. The olefin occurs in many species of marine planktonic algae and is probably derived from the corresponding docosahexaenoic acid. Rhincalanus nasutus accumulates HEH nonselectively from its algal food together with the triglyceride lipids. Other, related copepods contain little or no HEH even when grown in cultures of algae that provide R. nasutus with that olefin. The presence of HEH in marine vertebrates suggests that, within the animal lipids, hydrocarbons are remarkably stable. This work has practical implications for studies of the marine food web and of marine pollution with persistent chemicals. (Author) Reprinted

6.39 (9.10) PICHIA SPARTINAE SP.N. FROM LOUISIANA MARSHLAND HABITATS

Ahearn, D. G. (Department of Biology, Georgia State University, Atlanta, Ga. 30303) D. Yarrow (Yeast Division, Centraalbureau voor Schimmelcultures, Laboratory of Microbiology, University of Technology, Delft, The Netherlands), and S. P. Meyers (Department of Food Science and Technology, Louisiana State University, Baton Rouge, La. 70803)
Antonie van Leeuwenhoek 36, No. 4, 503-508 (1970) (Swets & Zeitlinger, Publishers, Keizersgracht 471, Amsterdam, The Netherlands)

During studies of the oyster grass ecosystem, Meyers et al. (1970) noted the presence of a yeast biomass as great as 90,000 viable cells/cu. cm. of sediment. In the marshland sediments and within the oyster grass culm was a species of Pichia (FST 119), one of the predominant species present, that had the ability to use a large number of amine compounds. This ability suggested to the authors that yeasts may play some part in nitrogen regeneration in the marine environment. Further examination showed that the species has been hitherto undescribed and that it occurs in both the homothallic and the heterothallic state. In view of the vast ecological significance of the estuarine marshlands, the authors consider the widespread abundance of the yeast there particularly significant.
[4 figures, 5 references] LB

6.32 (8.53) STEROLS OF OOCYSTIS POLYMORPHA, A GREEN ALGA

Orcutt, David M., and Billy Richardson
Report No. SAM-TR-70-278, 20 pp. (June 29, 1970) (School of Aerospace Medicine, Brooks AFB, Tex.)
U.S. Government Research & Development Reports 71, No. 2, 31 (January 25, 1971)
Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. AD-714 955, Reprint

Analysis by gas liquid chromatography and mass spectrometry indicates that the major sterols of Oocystis polymorpha are cholesterol, Delta 7,22-ergostenol (24 beta-methylcholesta-7,22-dien-3 beta-ol) Delta 7-ergostenol (24 beta-methyl - cholest-7-en-3 beta-ol), chondrillasterol (24 beta-ethylcholesta-7,22 dien-3 beta-ol) and Delta 7-chondrillasterol (24 beta-ethylcholest-7-en-3 Delta-ol). Cholesterol constitutes a greater proportion of the sterol ester fraction than of the total sterols. Fatty acid composition of the sterol ester fraction is markedly different from the total fatty acid composition. The percentage of total sterols present as cholesterol is greater in cells grown on glucose or acetate than in cells grown on CO_2, and in heterotrophic cells the cholesterol level is higher in light than in darkness. (Author) Reprinted

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6.30 (1.013) ECONOMICALLY IMPORTANT SEAWEEDS, IN CHILE - I. GRACILARIA

Kim, Dong Ho (Instituto Central de Biología, Universidad de Concepción, Chile)
Botanica Marina 13, No. 2, 140-162 (1970) (Walter de Gruyter & Co., Dl Berlin 30, Genthiner Strasse 13, West Germany)

The two most economically important seaweeds in Chile, Gracilaria lemanaeformis and G. verrucosa, are described taxonomically, ecologically, chemically, industrially, and commercially.
[61 figures, 13 tables, 13 appendices, lavish references] LB

6.35 CURRENT STRUCTURAL VIEWS OF RED SEAWEED POLYSACCHARIDES

Mueller, George Peter, and D. A. Rees (Marine Colloids, Inc., Rockland, Maine)
Chemical Abstracts 74, No. 5, 19527b (February 1, 1971)

4.5 (0.33)(4.6) FREE RADICALS, MALONALDEHYDE AND PROTEIN DAMAGE IN LIPID-PROTEIN SYSTEMS

Roubal, W. T. (Pioneer Research Laboratory, National Marine Fisheries Service, 2725 Montlake Boulevard East, Seattle, Wash. 98102)
Lipids 6, No. 1, 62-64 (January 1971)

In systems containing lipid and proteins, polyunsaturated fatty acids undergoing oxidation induce extensive changes in enzymes, proteins, and nucleotides. Furthermore, the radicals derived from the oxidizing lipid may be the chief cause of damage. However, aldehydes or nonradical lipid oxidation products also may be capable of causing damage to such compounds. In this study, the author tried to determine which mechanism, the radical or the nonradical, dominates in systems containing protein in close association with oxidizing lipid.

The fatty acid mixture that was used consisted of 75% by weight of $C_{22:6}$ acid and 25% of $C_{20:5}$ acid. The proteins consisted of rockfish myofibrillar protein and bovine serum albumin. The test mixtures were prepared by mixing together the lipid and dry protein. The samples were allowed to oxidize at room temperature. In the EPR study, all samples were analyzed at room temperature as described previously by the author in the Journal of the American Oil Chemists' Society 47, 141 (1971). The free radical concentration in the lipid-protein mixtures (having a low moisture content) was monitored during the time and after the time that the lipid actively absorbed oxygen. The author found that the decay in radical content is followed by a rise in malonaldehyde protein fluorescence. Major losses in amino-acid content occurred rather early in the oxidation. The author concluded that the results substantiate the hypothesis [previously introduced by W. T. Roubal and A. L. Tappel, Arch. Biochem. Biophys. 113, 150 (1966)] that radicals, not aldehydes, are the major cause of protein damage.
[2 figures, 9 references] FTP

6.34

fragment of alginate consists of sequences of alternating M and G residues whose average length is at least 10 monomer units.
[3 figures, 6 tables, 25 references] LB

6.36 (0.4) EFFECTS OF LAMINARIN SULPHATE ON EXPERIMENTAL ATHEROSCLEROSIS AND ON SERUM LIPIDS IN RABBITS DURING LONG-TERM INTERMITTENT CHOLESTEROL FEEDING

Besterman, E. M. M. (Cardiology Department, St. Mary's Hospital, London W2, England)
Atherosclerosis 12, No. 1, 85-96 (July-August 1970) (Elsevier Publishing Co., P.O. Box 211, Amsterdam, The Netherlands)

A search was conducted to find a sulfated polysaccharide that would have an antilipaemic effect--but not be anticoagulant or toxic--when used on man. Although most of the heparinoids tested did not have these qualities, one laminarin compound (isolated from the Laminaria clouston) supplied by the Institute of Seaweed Research, Inverask, Scotland) appeared to be active, noncoagulant, and nontoxic and to have a heparinlike antilipaemic action. In a long-term study on cholesterol-fed rabbits, the laminarin sulfate inhibited coronary and aortic atherosclerosis and produced relatively few side effects. Its most significant effect on the serum lipids was on the β/α-lipoprotein ratios, which were usually related to the degree of experimental atherosclerosis induced.
[5 figures, 8 tables, 19 references] LB

6.54 PROTEIN AUTOLYSIS RATES AT VARIOUS pH'S AND TEMPERATURES IN HAKE, MERLUCCIUS PRODUCTUS, AND PACIFIC HERRING, CLUPEA HARENGUS PALLASI, AND THEIR EFFECT ON YIELD IN THE PREPARATION OF FISH PROTEIN CONCENTRATE

Koury, Barbara, John Spinelli, and Dave Wieg (National Marine Fisheries Service Technological Laboratory, 2725 Montlake Boulevard East, Seattle, Wash. 98102)
Fishery Bulletin 69, No. 1, 241-246 (January 1971) (U.S. Department of Commerce, NOAA, National Marine Fisheries Service, Publications Services Staff, 1801 North Moore St., Arlington, Va. 22209)

The production of fish protein concentrate (FPC) requires a process that efficiently removes oil and water from the fish and provides high yields of protein. Although FPC can be prepared by several different methods, the most effective procedures developed to date are based on systems in which comminuted fish is successively extracted with a suitable solvent.

In solvent extraction procedures for FPC production, the yield of product (excluding physical losses) is dependent upon the amount of proteinaceous material soluble in the extracting solution. Whereas losses can be controlled to some extent by the choice of solvent systems, the possibility of losses due to enzymatic degradation of protein must also be considered. The purposes of this study were (1) to determine the effect of pH, time, and temperature on the rate of protein autolysis in two species of fish that are considered for use in the production of FPC and (2) to determine the effect of autolytic activity on FPC yields.

Hake and Pacific herring were used. Rates of proteolytic enzyme activity at pH 6.0, 5.0, 4.5, 4.0, and 3.0 were measured at temperatures of 30°, 40°, 50°, 60°, 70°, and 80°C. The FPC was prepared by isopropanol extraction.

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6.54 EFFECT OF ICE STORAGE ON THE CHEMICAL AND NUTRITIVE PROPERTIES OF SOLVENT-EXTRACTED WHOLE FISH--RED HAKE, UROPHYCIS CHUSS

Dubrow, David L., Norman L. Brown, E. R. Pariser, Harry Miller, Jr., V. D. Sidwell, and Mary E. Ambrose (National Marine Fisheries Service National Center for Fish Protein Concentrate, College Park, Md. 20740)
Fishery Bulletin 69, No. 1, 145-150 (January 1971) (U.S. Department of Commerce, NOAA, National Marine Fisheries Service, Publications Services Staff, 1801 North Moore St., Arlington, Va 22209)

Because red hake that are to be used in the future production of fish protein concentrate will be caught in quantity, the preservation of the hake during periods of glut will present a problem that possibly can be solved by storage of the hake in ice.

Whole red hake were stored in ice for 2, 6, 8, and 11 days. The fish were organoleptically evaluated for freshness at each storage period and were then processed by freeze-drying to form a reference sample or by solvent extraction with isopropyl alcohol to form a fish protein concentrate. These products were then analyzed for proximate composition and amino acid concentration and for protein quality.

The results of the subjective evaluation for freshness indicated that the fish stored up to 8 days were still acceptable for food but that those stored for 11 days were not acceptable.

The proximate composition and the amino acid concentration of the freeze-dried whole samples of fish showed very little change as a result of the storage of the raw fish in ice. Rat-feeding tests indicated a loss in protein quality of the

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6.54 CHEMICAL AND NUTRITIONAL CHARACTERISTICS OF FISH PROTEIN CONCENTRATE PROCESSED FROM HEATED WHOLE RED HAKE, UROPHYCIS CHUSS

Dubrow, David L., and Bruce R. Stillings (National Marine Fisheries Service National Center for Fish Protein Concentrate, College Park, Md. 20740)
Fishery Bulletin 69, No. 1, 141-144 (January 1971) (U.S. Department of Commerce, NOAA, National Marine Fisheries Service, Publications Services Staff, 1801 North Moore St., Arlington, Va. 22209)

This study was to determine whether cooking lean, whole fish before they are extracted by solvent affects the chemical and nutritional characteristics of the resulting fish protein concentrate.

We determined the chemical composition and nutritional quality of FPC produced from fish that are heated before they were extracted with solvent. Red hake, which are lean fish, were heated at 100° C for 10, 20, 40, or 80 min. Other samples were heated for these same lengths of time at 109° or 121° C. The samples were then extracted with isopropyl alcohol. The FPC produced from the samples of hake that were heated contained slightly less crude protein and more ash than did the FPC produced from the samples that were not heated. The amino acid composition of samples that had been heated did not differ markedly from the composition of those that were not heated. The nutritive quality of the samples that were heated at 100° and 109° C was not significantly affected. Samples heated at 121° C, however, were lower in quality than was the control sample.

We conclude that red hake can be heated at temperatures of 100° and 109° C for as long as 80 min. before being extracted by solvent without the quality of the protein being affected significantly. [3 tables, 10 references] Reprinted in part

7.42 AN ATTEMPT OF APPLYING LASER RAYS FOR THE DETECTION AND ANALYSIS OF CHEMICAL ELEMENTS IN TISSUE SLICES

Kozik, M. (Neurologische Klinik, Przybyszewskiego 49, Poznań, Poland), B. Arcimowicz, and J. Dembczyński
Acta Histochemica 37, No. 1, 203-205 (1970) (VEB Gustav Fischer Verlag, 69 Jena, Villengang 2, German Democratic Republic)

Not only do animal tissues contain abundant organic compounds, they also contain numerous inorganic elements. Although methods of detecting proteins, carbohydrates, and lipids in these tissues are well advanced, development of methods for detecting the inorganic elements, which are often present in minute amounts only, seems to be lagging. Available techniques for detecting tissue cations are based either on micro-incineration procedures or on color reactions. Both are troublesome to perform and give unspecific and often highly erroneous results. This report describes a method wherein tissue slices are exposed to the action of a laser ray beam (wavelength λ = [1.6 nm.], 1 joule of energy) and the spot where the tissue is burned away is analyzed with a spectrograph. The spectrograms reveal bands characteristic of those given by various cations as well as those typical of the organic compounds. The method has two clear-cut merits: it requires a relatively small amount of tissue, for the diameter of the perforation made by the laser ray is only 30 μm; it gives two different, independent, analytical media--the stable histological preparation with the combustion hole in it, and the spectrogram. [2 figures] LB

(0.7)(1.0155) COMMERCIAL FEASIBILITY OF FISH PROTEIN CONCENTRATE IN DEVELOPING COUNTRIES. VOLUME I. THE PROTEIN SITUATION IN KOREA AND THE POTENTIAL ROLE FOR FISH PROTEIN CONCENTRATE

Report prepared by General Oceanology, Inc., Cambridge, Mass., in cooperation with the American Technical Assistance Corp., and Sidney M. Cantor Associates, Inc. Final Report, 145 pp. (October 1969)
U.S. Government Research & Development Reports 71, No. 2, 42 (January 25, 1971)
Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. PB-195 913, PC$3.00, microfiche 95¢

The report establishes that protein malnutrition exists in certain groups in Korea, and that fish protein concentrate (FPC) might contribute to ameliorating this shortage. Present economics and raw material shortages, however, mitigate against a self-priming commercial FPC operation in Korea today. However, some alternative paths for protein relief through FPC are possible. The report reviews protein nutrition, and the Korean protein system, and calculates the 'protein gap' for the groups and determines the cost/effectiveness of protein fortification. It examines the feasibility of producing FPC locally, the implications of a protein supplement program on national nutrition policies and the cost of closing the protein gap. (Author) Reprinted

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7.42 DETERMINATION OF MERCURY IN FISH BY FLAMELESS ATOMIC ABSORPTION: A COLLABORATIVE STUDY

Munns, R. K., and D. C. Holland (Food and Drug Administration, 20th and California Streets, Denver, Colo. 80202)
Journal of the Association of Official Analytical Chemists 54, No. 1, 202-205 (January 1971)

The most sensitive and specific method for the determination of mercury at present appears to be the one based on the measurement of the volatilized mercury vapor by flameless atomic absorption. This method was tested in a collaborative study for the analysis of total mercury in fish. Nine laboratories were involved. The overall mercury recovery in the test samples was 83.5%; the standard deviation was 0.066. The authors recommend that the flameless atomic absorption method for mercury be adopted as official first action.
[2 figures, 2 tables, 18 references] FTP

For analysis of certain types of natural waters, the American Public Health Association silver diethyldithiocarbamate method for arsenic is unreliable. Apparently, interference with the evolution of arsine in the procedure causes either color enhancement or arsine suppression.
[2 figures, 2 tables, 15 references] FTP

7.42 ARSENIC IN POTABLE DESERT GROUNDWATER: AN ANALYSIS PROBLEM

Whitnack, G. C. (Michelson Laboratory, Naval Weapons Center, China Lake, Calif. 93555) and H. H. Martens (Boron Community Services District, Boron, Calif. 93516)
Science 171, No. 3969, 383-385 (January 29, 1971)

6.54 EVALUATION OF THE QUALITY OF FOOD MEAL FROM THE CASPIAN SPRAT OBTAINED BY VARIOUS METHODS

Egorova, L. N., and V. I. Treshcheva (U.S.S.R.)
Chemical Abstracts 72, No. 21, 109879f (May 25, 1970)

6.54

The study showed that the endogenous proteolytic enzymes in fish hydrolyze the proteins into subunits that are not coaguable by the isopropanol concentration normally used in the preparation of FPC. The preparation of FPC made from autolyzing hake showed that the yield bore a close inverse relation to the degree of autolysis.

The autolysis rates in Pacific herring and hake were related to pH and temperature, the rates showing an increase with increasing temperature and a decreasing pH. Maximum activity was reached at about 50° C. Inactivation of the enzymic systems occurred when temperatures exceeded 70° C.

Because the economic success of any method that is used for the preparation of FPC is largely dependent on the yield of finished product obtained from a given amount of raw material, autolysis should be closely controlled.
[6 figures, 10 references] FTP

6.54 NUTRITIVE VALUE OF BENGAL GRAM (CHICKPEA). II. ASSESSMENT OF THE NUTRITIVE VALUE OF FORMULATED FOODS BASED ON BENGAL GRAM (CHICKPEA) AND FISH PROTEIN CONCENTRATE AND EGG POWDER BY DETERMINATION OF THEIR PROTEIN AND CALORIE EFFICIENCY RATIO VALUES AND LIVER FAT AND PROTEIN-NITROGEN CONTENTS

De, H. N., S. A. Khan, N. I. Mullick, and Amirul Islam (Food Sci. Technol. Div., P.C.S.I.R., Dacca, Pakistan)
Chemical Abstracts 72, No. 23, 118993r (June 8, 1970)

6.54

freeze-dried sample prepared from 11-day-old raw fish. Protein efficiency ratio values ranged from 3.35 to 3.49 for fish stored up to 8 days, whereas the 11th-day sample resulted in a protein efficienty ratio of 3.18. All protein efficiency ratio values, however, were equal to the value for casein or were higher.

The proximate composition of FPC's produced from fish stored up to 8 days in ice remained relatively constant. The crude protein in the concentrate produced from fish stored for 11 days decreased about 2.5%. The concentration of amino acids also followed this pattern with a resultant lowering in the concentration of lysine and a slight increase in that of proline and glycine. The protein quality of the FPC processed from the 11-day-old fish was also slightly lower than that of FPC processed from fresher fish. All FPC's, however, had protein efficiency ratios higher than that of casein.

We conclude that storage of whole hake in ice up to 8 days is a satisfactory means of holding them prior to extracting the ground hake with isopropyl alcohol to produce FPC. [7 tables, 7 references] Reprinted in part

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6.54 PROCESS FOR CONCENTRATING FISH PROTEIN

British Patent 1,217,783
Beliot Corporation (U.S.A.) (pat.)
BFMIRA Abstracts 24, No. 2, Abstract No. 642, 134 (February 1971)

The process which consists of a number of steps involving the removal of soluble materials such as oil and other lipids from fish protein using such a solvent as isopropanol. Reprinted

7.42 DETERMINATION OF MERCURY IN FOOD PRODUCTS AND BIOLOGICAL FLUIDS BY AERATION AND FLAMELESS ATOMIC ABSORPTION SPECTROPHOTOMETRY

Thorpe, Virginia A. (Michigan Department of Agriculture, Lansing, Mich. 48823)
Journal of the Association of Official Analytical Chemists 54, No. 1, 206-210 (January 1971)

This paper describes a simple, rapid method for determining mercury in fish and other food products. The method is an adaptation of the one proposed by J. F. Uthe, F. A. J. Armstrong, and M. P. Stainton [Journal of the Fisheries Research Board of Canada, Freshwater Institute, Winnipeg, Manitoba (1970), to be published] as modified by R. Krueger [Water Resources Commission of the State of Michigan, Lansing, Michigan, unpublished (1970)]. The food samples are wet digested and digestion procedures are described for fish; meat; poultry; eggs, milk, water, blood; and animal feeds. The author obtained good precision on the analyses of replicate samples on different days by the method, and also obtained adequate recovery of mercury in spiked samples. [3 figures, 4 tables, 4 references] FTP

7.524 METHODS OF ANALYSES FOR THE SULFUR AMINO ACIDS

Hackler, L. R. (Subcommittee on Protein Standards, Animal Nutrition Research Council)
Feedstuffs 43, No. 9, 18 (February 27, 1971)

In 1968, Porter et al. published the results of a collaborative test on determining amino acids by ion-exchange chromatography. Use of automatic amino-acid analyzers, according to the present author, is precise and accurate only for the amino-acid standard. The results on gelatin and cod-muscle proteins were quite poor, the percentage deviation from the mean being as much as 175% for methionine and as much as 50% for several other amino acids. As a rule, the two-column system gave better results than the single-column system gave.

Investigations by the ANRC Subcommittee on Protein Standards showed large losses of methionine during hydrolysis of proteins with 6N HCl. The author suggests that those losses can be minimized and precision and accuracy improved if all air is carefully removed from the hydrolysis flask and proper care is taken when the sample is applied on the column. The resin, the buffer system, and the hydrolysis procedures used by the author prevented decreases in methionine during hydrolysis. However, the percent of methionine in food proteins of differing chemical composition did vary as hydrolysis time was varied.

Cysteine and cystine are the other sulfur amino acids nutritionists must be concerned with in their evaluations of protein quality. The author suggests that the method reported by researchers at the Rockefeller Institute (in which cysteine and cystine are converted to cysteic acid by performic acid) gives good results with both the two-column and the single-column analyzer. However, with the single-column analyzer, the results must be quantitated from standard amino-acid mixtures

 (over)

7.51 (6.190) MINERAL MIXTURE COMPOSITION--A FACTOR IN CHICK BIOASSAYS OF THE PROTEIN QUALITY OF FISH MEALS

Miller, David (National Center for Fish Protein Concentrate, Bureau of Commercial Fisheries, College Park, Md. 20740)
Poultry Science 49, No. 6, 1535-1540 (November 1970)

The purpose of this study was to determine the effect on chick growth responses of (1) decreasing the amount of Cl, SO_4, and Fe in the mineral mixtures, (2) adding antiacids, and (3) decreasing the amounts of Ca and PO_4 in various diets in which fish meal supplied the sole source of protein. The author found that evaluation of the quality of the protein in fish meals fed to chicks as the sole source of protein is influenced by the composition of the mineral mixture included in the diet. Antiacids were beneficial supplements for some fish meals, probably by counteracting the acid components. Reducing the dietary contribution of Cl from 0.542% to 0.304% and SO_4 from 0.432% to 0.032% (and simultaneously increasing the CO_3 content) of the mineral-mixture improved the growth response of the chicks to a range of from 9% to 40% for the various fish meals fed to supply the entire dietary proteins (15%).

Levels of 1.25% Ca and 0.8% P in the diet gave the same growth response of the chicks as did the 1.50% Ca and 1.0% P levels. Addition of 40 p.p.m. of Fe was not adequate for optimum growth of the chicks.
[6 tables, 10 references] FTP

7.595 DETERMINING ANTIOXIDANT ETHOXYQUIN IN FISH MEAL -- A CHILEAN METHOD

Anonymous
Fishing News International 9, No. 12, 37-38 (December 1970)

Because oxidation in fish meal can lead to deterioration as well as to spontaneous combustion of the meal, many manufacturers are required to show by analysis that their meal contains a minimum quantity of antioxidant before the meal can be shipped. Ethoxyquin is the most commonly used of these antioxidants. But accurate methods for determining ethoxyquin are time consuming and expensive and simpler methods are inapplicable to fish meal. Earlier methods involve the use of chromatography (an expensive, time-consuming technique unsuited to routine analysis) to remove fats and other materials that interfere with the measurements. Or they do not reduce the quantity of interfering substances sufficiently to ensure realistic values.

Emilio Contreras, of the Instituto de Fomento Pesquero (Av. Pedro de Valdivia 2633, Casilla 1287, Santiago, Chile), has published a method based on the procedure developed by D. A. Reid and J. J. Doesburg at the University of Cape Town, Fishing Industry Research Institute. However, he adds a step that frees the ethoxyquin from interfering substances--neutralization of the ethoxyquin-containing hydrochloric acid solution with alkali and re-extraction of the ethoxyquin into fresh organic solvent--and he determines the amount of ethoxyquin present by using DPPH as a reagent rather than by using the less sensitive direct determination of the South African method.

(over)

7.53 RAPID TECHNIQUE FOR SOLVENT REMOVAL IN THE DETERMINATION OF FAT

Cohen, Edward H. (Eastern Utilization Research and Development Division, ARS, U.S. Department of Agriculture, Philadelphia, Pa. 19118)
Journal of the Association of Official Analytical Chemists 54, No. 1, 212-214 (January 1971)

The author describes a rapid method for removing solvent in the determination of fat by the use of a nitrogen gas manifold and an aluminum cooling chamber. Only 4-10 min. are required by this new procedure; about 60 min. are required by the regular method. The precision of the new technique was as acceptable as the official method. [2 figures, 1 table, 2 references] FTP

7.595

In a test of the new method, Sr. Contreras treated samples of anchovy meal with 0, 250, 500, or 1,000 p.p.m. ethoxyquin, stored them for 2 months, and then analyzed them by his method and by the more elaborate Brueggeman (1963) method. The amount of ethoxyquin recovered by the two methods was not significantly different. A step-by-step summary of the method is given.
[1 table, 4 references] LB

7.51 STUDIES ON GEL FILTRATION OF FISH MUSCLE PROTEIN.
I. PRELIMINARY EXPERIMENTS ON GEL FILTRATION WITH AGAROSE GELS

Umemoto, Shigeru, and Koichi Kanna (Tokai Reg. Fish. Res. Lab., Tokyo, Japan)
Chemical Abstracts 73, No. 9, 43976x (August 31, 1970)

IV. CHANGES IN ELUTION PATTERNS BY GEL FILTRATION OF EXTRACTABLE PROTEINS OF FISH AND RABBIT MUSCLES DURING COLD STORAGE AT -20°

Umemoto, Shigeru, and Koichi Kanna
Ibid. No. 25, 129699w (December 21, 1970)

7.591 DISCOLORATION OF RED FISHES. VI. PARTIAL PURIFICATION AND SPECIFICITY OF THE LIPOXIDASELIKE ENZYME RESPONSIBLE FOR CAROTENOID DISCOLORATION IN FISH SKIN

Tsukuda, Nobuo (Tokai Reg. Fish. Res. Lab., Tokyo, Japan)
Chemical Abstracts 74, No. 5, 20786s (February 1, 1971)

7.594 THIN-LAYER CHROMATOGRAPHIC STUDY OF CANNING PROCESSES.
II. CHOLESTEROL CONTENT OF SZEGED FISH SOUP (3.235)

Aczel, Attila (Szegedi Konzervgyar, Szeged, Hungary)
Chemical Abstracts 74, No. 5, 21971k (February 1, 1971)

7.43 (9.19) A MARKOVIAN SAMPLING POLICY APPLIED TO WATER QUALITY MONITORING OF STREAMS

Arnold, J. C. (Department of Statistics, Virginia Polytechnic Institute, Blacksburg, Va. 24061)
Biometrics 26, No. 4, 739-747 (December 1960)

The author suggests a sampling procedure for monitoring the outgoing quality of a process. Although the procedure is applicable to other sampling inspection problems, he is concerned in this report with its application to the quality control sampling of dissolved oxygen in streams. With the procedure, a variable sampling ratio is used, less frequent samples being required when the process is in control. The author indicates that the procedure can be considered as a simple Markov process. The report has three sections. In the first, the sampling plan is defined and some of the properties of the procedure are considered; in the second, the application of the procedure to the problem of sampling streams for control of water pollution is discussed; and in the third, the usefulness of the procedure for large-scale sampling projects is demonstrated.

The author considers this procedure worthwhile for the following reasons: a feasible sampling plan can be chosen before sampling begins; cost of the program and its sensitivity in detecting substandard amounts of dissolved oxygen can be predetermined; monographs and tables can be computed to help the field worker determine when his next sample should be taken; whether or not one can afford the sample size required to detect pollution as quickly as desired can be estimated. [3 figures, 3 tables, 3 references] LB

7.524

rather than calculated as a ratio to aspartic acid, based on a previous 6N HCl hydrolyzate. Even so, the 94% recovery of cystine as cysteic acid (as given in the Rockefeller report) cannot be obtained with food proteins.

The author recommends that researchers use a microbiological procedure when they need to analyze several samples for just one or two amino acids. He suggests that gas chromatography might develop into a useful means of assaying for the sulfur amino acids. He knows of no single method of sample preparation or of analysis that is suitable for determining all amino acids in a single run. He also strongly recommends that amino-acid analyses be standardized, particularly those for the sulfur amino acids. [1 table, 7 references] LB

7.591 RAPID AND COMPLETE PURIFICATION OF ACETYLCHOLINESTERASES OF ELECTRIC EEL AND ERYTHROCYTE BY AFFINITY CHROMATOGRAPHY

Berman, Jonathan Dembitz, and Michael Young (Harvard Medical School, Boston, Massachusetts General Hospital, Boston, Mass. 02114)
Proceedings of the National Academy of Sciences of the United States of America 68, No. 2, 395-398 (February 1971)

The work reported in this article was carried out to facilitate complete purification of acetylcholinesterase from the electric tissue of Electrophorus electricus and from bovine erythrocyte membranes prior to comparative studies of their molecular structures and function. Affinity chromatography was used to purify the acetylcholinesterase. [2 figures, 2 tables, 12 references] FTP

7.879 (4.5) DIRECT DETERMINATION OF THE THIOBARBITURIC ACID VALUE IN TRICHLORACETIC ACID EXTRACTS OF FISH AS A MEASURE OF OXIDATIVE RANCIDITY

Vyncke, W. (Ministry of Agriculture, Fisheries Research Station, Ostend, Belgium)
Fette·Seifen·Anstrichmittel 72, No. 12, 1084-1087 (1970)

Thiobarbituric acid (TBA) test values are used as a measure of oxidative rancidity in plant and animal tissues, oils, fats, and fat-containing foods. The TBA reacts with the malonaldehyde, principally, of the oxidized lipids to give a red color upon which the test is based. In the analysis of fishery products, the TBA-active substances are separated from the fish muscle before the TBA-reagent is added. The purpose of the present study was to examine the possibility of direct determination of the TBA value in trichloracetic acid (TCA) extracts instead of in the distillates. The white muscle in fish showing varying degrees of rancidity was used in the experiments.

The TCA extraction technique gave an average recovery of 95.3% with herring, redfish, cod, and plaice muscle; it gave only 75.2% recovery with spurdog muscle (apparently this low recovery with the spurdog was due to the urea present). With the distillation technique, the recovery averaged 66.1% for the teleost fishes and 43.0% for the spurdog. Addition of 1% propyl gallate (PG) and of EDTA (ethylenediaminetetraacetate) reduced the TBA values (by the TCA extraction method) by 25% to 59%.

The author concludes that the TCA extraction method can be used for determining TBA value in fish but that an antioxidant and a chelating agent should be added to avoid erroneously formed malonaldehyde or other TBA reactive substances during blending and filtering of the sample. The TCA extraction method is simple and rapid. [5 tables, 15 references] FTP

8.8 (1.013) (1.85) BACTERIOLOGICAL ANALYSIS OF FROZEN SHRIMPS. 1. TOTAL PLATE COUNT--COLIFORMS AND ENTEROCOCCI IN PRECOOKED FROZEN CHILEAN SHRIMP

Virgilio, R., C. González, Silvia Mendoza, Sonia Avendaño, and Nubia Muñoz (Departmento de Microbiología, Instituto de Investigaciones y Ensayos Farmacológicos Facultad de Química y Farmacia, Universidad de Chile, Santiago, Chile)
Journal of Food Science 35, No. 6, 842-844 (November-December 1970)

During a period of 8 months, 392 samples of frozen precooked shrimp from two plants (A and B) in Chile were analyzed for total bacterial, coliform, and enterococci counts. Also, the effect on bacterial counts of the samples after improved sanitary practices were initiated was investigated.

Total bacterial counts of the samples from both plants ranged from 10^4 to 10^5 bacteria per gram. Coliform bacteria were absent in 65% of the samples from plant A and in 40% of the samples from the plant B. From the bacteriological standpoint, 89.6% of the samples from plant A and 50.1% of the samples from plant B were acceptable (that is, they showed less than 50 coliform bacteria per gram of sample). Samples from plant A contained 98% enterococci bacteria and those from plant B contained 66%. After some additional sanitary measures were introduced in the plants, the coliform bacteria counts improved (that is, the counts decreased).
[1 figure, 4 tables, 16 references] FTP

7.86 (0.5) ISOLATION OF *SHIGELLA* FROM FOODS

Fishbein, Morris, Ira J. Mehlman, and Barry Wentz (Division of Microbiology, Food and Drug Administration, Washington, D.C. 20204)
Journal of the Association of Official Analytical Chemists 54, No. 1, 109-111 (January 1971)

In 1969, Morris Fishbein recommended (at the 83rd Annual Meeting of the AOAC, October 1969, Washington, D.C.) a tentative method for the recovery of *Shigella* from foods. In the present study, the authors used the general procedure to analyze some food products including ground meat, crab meat, milk, and raw chicken. The basic purpose of these experiments was to determine optimal conditions for the multiplication of *Shigella* under competitive (bacterial) stress. They also determined the effects of oxygen tension and metabolites on the growth of *Shigella*.

The limitations of the *Shigella* detection system was defined and an extremely sensitive model for *Shigella* enumeration was devised for laboratory experimentation. The new model testing procedure should help simplify any study on the effects of physical, chemical, and nutritional factors on the productivity of *Shigella* recovery under competitive stress. [1 table, 9 references] FTP

9.1 PARADOX OF ENRICHMENT: DESTABILIZATION OF EXPLOITATION ECOSYSTEMS IN ECOLOGICAL TIME

Rosenzweig, Michael L. (Department of Biological Sciences, State University of New York, Albany, N.Y. 12203)
Science 171, No. 3969, 385-387 (January 29, 1971)

Schemes for increasing primary productivity by enriching an ecosystem's energy or nutrient flow probably reflect the increasing demands of the world's population. The author believes, however, that such schemes may end in catastrophe. He presents in this article six reasonable models of trophic exploitation in a two-species ecosystem whose exploiters compete only by depleting each other's resource supply. In each model, increasing the supply of limiting nutrients or energy tends to destroy the steady state. Therefore, the author warns man must be very careful in attempting to enrich an ecosystem in order to increase its food yield. Apparently, there is a real chance that such activity may result in decimation of the food species that are wanted in greater abundance.
[2 figures, 7 references] FTP

7.86 (3.15)(0.5)

RADIATION SENSITIVITY AND BIOCHEMICAL CHARACTERISTICS OF MICROFLORA OF BOMBAY DUCK (HARPODON NEHEREUS)

Kumta, U. S., and S. S. Mavinkurve (Bhabha Atomic Research Centre, Biochemistry & Food Technology Division, Trombay, Bombay-85, India)
Journal of Food Science 36, No. 1, 63-66 (January-February 1971)

This paper describes the various types of organisms associated with the raw fillets and the raw irradiated fillets of the fish Bombay duck. Also, the radiation sensitivity and biochemical characteristics of cultures of Proteus vulgaris, Acromonas hydrophila, and Micrococcus luteus were determined.

During spoilage of the raw Bombay duck fillets (stored at 10° C.), Vibrio, Aeromonas, and Proteus species predominated; during spoilage of irradiated fillets, Micrococci and Achromobacter species predominated. P. vulgaris and A. hydrophila produced large amounts of trimethylamine (TMA) and total volatile base (TVB) nitrogen and they were radiation sensitive (D_{10} values were 8.6 and 5.4 Krad, respectively.). M. luteus was relatively biochemically inert (that is, concerning its ability to produce TMA and TVB nitrogen) and was radiation resistant (D_{10} value was 88 Krad). [4 figures, 1 table, 19 references] FTP

9.11 (2.12)

VOLUME-SCATTERING-STRENGTH DEPENDENCE ON DEPTH AND FREQUENCY IN THE PACIFIC OCEAN OFF SAN FRANCISCO

Scrimger, J. A., and R. G. Turner (Defence Research Establishment Pacific, Victoria, British Columbia)
Journal of the Acoustical Society of America 48, No. 5 (Part 2), 1266-1274 (November 1970)

The authors' stated objective is to present some measurements that will help clarify and broaden our acoustic picture of the ocean's inhabitants. They developed a technique for examining the scattering characteristics in the upper 2,100 ft. of the ocean; their data are presented as spectra of scattering strength versus frequency at 10 evenly spaced depths between 200 and 2,000 ft. They also drew a set of profiles of scattering strength versus depth in each of four octave frequency bands between 0.625 and 10 kHz; eight measurements for these data were made between 0600 PST and 2000 PST. The scattering-strength profiles were integrated against depth to give column scattering values that could be displayed as a function of time. [18 figures, 5 references] LB

7.89 (9.19)(6.199)

DETERMINATION OF WARFARIN IN LIVER TISSUE BY GAS CHROMATOGRAPHY

Funnell, H. S., and N. Platonow (Laboratory of Toxicology, Department of Biomedical Sciences, University of Guelph, Guelph, Ontario, Canada)
Journal of Forensic Sciences 15, No. 4, 601-604 (October 1970)

Warfarin (3-α-phenyl-β-acetylethyl-4-hydroxycoumarin), a commonly used rodenticide, has on numerous occasions become mixed with animal feeds. Although a number of extractive techniques have been proposed over the past decade for determining the presence of warfarin in biological materials, the impurities in the final extract interfere with both qualitative and quantitative results. The authors describe a technique for extracting the warfarin, purifying the extract, and determining the compound in a silylated form of gas chromatography. Using the technique, they recovered about 80% of the warfarin added to liver tissue in concentrations ranging from 4 to 100 p.p.m.
[1 table, 5 references] LB

8.8 (2.05)(1.013) (1.85)

BACTERIOLOGICAL ANALYSES OF FROZEN SHRIMP. 2. STAPHYLOCOCCI IN PRECOOKED FROZEN CHILEAN SHRIMP

Virgilio, R., C. González, Silvia Mendoza, Sonia Avendaño, and Nubia Muñoz (Departmento de Microbiología, Instituto de Investigaciones y Ensayos Farmacológicas Facultad de Química y Farmacia, Universidad de Chile, Santiago, Chile)
Journal of Food Science 35, No. 6, 845-848 (November-December 1970)

Samples (392) of frozen precooked shrimp from two plants in Chile were checked for Staphylococcus aureus by direct plating on Difco mannitol salt agar. Of the total samples, 140 (35.7%) contained S. aureus with one half this number having counts over 100 organisms per gram. Counts of S. aureus within the range of from 0 to 100 microorganisms per gram occurred in 82.4% of the samples. The authors conclude that hand-processed shrimp are prone to contamination by S. aureus but good quality (bacteriologically) products are possible when stringent sanitary measures are practiced. [1 figure, 4 tables, 18 references] FTP

7.879 ESTIMATION OF HYPOXANTHINE CONCENTRATIONS IN FISH MUSCLE BY A RAPID, VISUAL MODIFICATION OF THE ENZYMIC ASSAY PROCEDURE

Burt, James R., G. D. Stroud, and Noel Rees Jones (Torry Res. Sta., Min. Technol., Aberdeen, Scotland)
Chemical Abstracts 74, No. 1, 2737x (January 4, 1971)

9.125 (1.36) IDENTIFICATION AND DISTRIBUTION OF THE LEYDIG CELL HOMOLOG IN THE TESTIS OF SEXUALLY MATURE ATLANTIC SALMON (SALMO SALAR)

O'Halloran, M. J., and David R. Idler (Halifax Lab., Fish. Res. Bd. Canada, Halifax, Nova Scotia)
Chemical Abstracts 74, No. 3, 10793c (January 18, 1971)

8.8 (7.594)(3.337) SQUALENE INDEX AS AN ANALYTICAL CHARACTERISTIC OF VEGETABLE OILS USED IN THE PRESERVATION OF FISH

De Lima Brito, Lucilia (Inst. Port. Conservas, Peixe, Brazil)
Chemical Abstracts 74, No. 5, 21926z (February 1, 1971)

8.59 (1.92) HISTOCHEMICAL STUDIES IN THE BRAIN OF CERTAIN TELEOSTEAN FISHES II. CARBOHYDRATES: 1:2 GLYCOL GROUP, GLYCOGEN, GROUND SUBSTANCE AND ACID MUCOPOLYSACCHARIDES

Saxena, P. K. (Department of Zoology, Punjab Agricultural University, Ludhiana, India)
Acta Anatomica 76, No. 3, 439-453 (1970) (S. Karger AG, Arnold-Böcklin-Strasse 25, CH-4000 Basel 11, Switzerland)

The distribution of various types of carbohydrates in the brains of Notopterus notopterus (Pallas) and Puntius ticto (Ham.) is reported.
[16 figures, 5 tables, 28 references] LB

9.12 STUDIES ON THE VALUE OF THE PLASMA PROTEINS IN THE CLASSIFICATION OF THE ELASMOBRANCH FISHES

Herald, Earl S., Alan Leviton, and Robert P. Dempster
Final Report for the Steinhart Aquarium, California Academy of Sciences, San Francisco, Calif., 47 pp. (June 30, 1970)
U.S. Government Research & Development 71, No. 1, 42, 43 (January 10, 1971)
Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. AD-714-160, PC$3.00, microfiche 95¢

During the three-year period of this project, blood samples were taken from two species of cyclostomes, 27 species of elasmobranchs, and for comparative purposes 24 species of bony fishes and 9 species of higher vertebrates. All samples were processed through the microzone cellulose acetate electrophoretic equipment as well as duplicate runs for many species through acrylamide gel disc electrophoresis process. From these data it can be stated that (1) those elasmobranchs and bony fishes studied do have characteristic electrophoretic and ultracentrifuge patterns which can be used in systematic studies as an aid in species and group identification; (2) and because of the effects of stress and maturity, caution must be taken when interpreting the results from a single animal; (3) elasmobranchs, contrary to some reports, do have an albumin-like component in their serum which in the ultracentrifuge and electrophoretically is close to, if not identical with mammalian albumin; (4) physiological changes resulting from environmental stress are reflected in the serum protein and deserve intensive study because of their adaptive values. (Author) Reprinted

9.13 OPAL PRECIPITATION BY MARINE GASTROPODS (MOLLUSCA)

Lowenstam, Heinz A. (Division of Geological Sciences, California Institute of Technology, Pasadena, Calif. 91109)
Science 171, No. 3970, 487-490 (February 5, 1971)

Certain unicellular algae, heterotrophs, Protozoa, and cellular-grade Metazoa can fix silica in the form of opal ($SiO_2 \cdot nH_2O$). These include the diatoms, some dinoflagellates, ebridians, most radiolarians, the Hyalispongia, many Demospongia, and the coralline sponges. Previous workers demonstrated that high amounts of silicon are present in radular teeth of a few gastropod species of the superfamily Patellacea. Others have reported that the teeth also contain high amounts of iron. The mineralogic form of the silicon-containing compound of the teeth is not clear.

Patellacea are found in all oceans and are common on rocky shores in the intertidal zone. Currently scientists are not certain whether the low amounts of silicon in surface waters is largely or entirely the result of biological activity or the result of inorganic processes. The ability to metabolize silicon by a biochemical system of the tissue grade of Metazoa, such as the Patellacea, Aquires greater significance, the author states, in view of the recent discovery that silicon may be important in the process of bone calcification in mammals. The purpose of this study was to determine the mineralogy of the silicon-bearing compound of radular sites of the Patellacea.

The silicon content of certain radular sites of the Patellacea is fixed in the form of the mineral opal. Opal and goethite apparently mineralize the cusps and bases of the teeth. Opalized base plates occurred only in the families Acmaeidae and Lepetidae and this may be of taxonomic significance. The author estimates that the opal fixed by the standing crop of Patellacea in the intertidal zone of the (over)

9.125 (9.17)(1.37) RESPONSES OF THE RESPIRATORY PUMPS TO HYPOXIA IN THE RAINBOW TROUT (SALMO GAIRDNERI)

Hughes, G. M., and R. L. Saunders (Research Unit for Comparative Animal Respiration, Bristol University)
Journal of Experimental Biology 53, No. 3, 529-545 (December 1970)

Although the pressure changes in the respiratory cavities of fishes are clearly related to the flow of water through the system, the situation is complicated by the variations in gill resistance during the respiratory cycle. Despite the number of measurements that have been made on ventilation volume and the effects of environmental changes on the activity of the pumps on the respiratory and cardiac sides of the exchanger, no detailed correlation of the pressure changes with the volume of water pumped across the gills has been attempted. The authors, therefore, measured the ventilation volume of rainbow trout and recorded simultaneously the pressure changes in the buccal and opercular cavities and the differential pressure across the gills.

The amplitude of pressures through the buccal and opercular cavities of the trout increased as the P_{O_2} of the inspired water decreased. (Pressure amplitudes in the resting trout were usually 0.5 cm. of water; they increased four- or five-fold as the P_{O_2} of the inspired water was reduced.) In addition, the differential pressure across the gills increased as hypoxia increased. As a rule, minute volume increased from about 0.2 to 0.6 liter/kg./min. when the P_{O_2} of inspired water was lowered from 150 to 80 mm. Hg; however, it rose to between 1 and 5 l./kg./min. when the P_{O_2} was lowered further, mainly as a result of the increased stroke volume (i.e., the volume of water pumped per respiratory cycle). Respiratory frequency remained fairly constant when the P_{O_2} was about 80 mm. Hg and above. Although the relation between differential pressure and minute volume was fairly

9.13 (1.125) BRAIN AND MUSCLE TEMPERATURES IN OCEAN CAUGHT AND CAPTIVE SKIPJACK TUNA

Stevens, E. Don (Department of Zoology, University of Hawaii, Honolulu, Hawaii 96822), and F. E. J. Fry (Department of Zoology, University of Toronto, Toronto, Ontario, Canada)
Comparative Biochemistry and Physiology 38, No. 1A, 203-211 (January 1, 1971)

The authors measured the temperature of brain, red muscle, and white muscle of Katsuwonus pelamis that they caught in Hawaiian waters by barbless hook and pole while chumming with live bait, as the local commercial fishermen do. They compared these data with those for skipjack held captive in large holding tanks. In addition, they examined the effect of exercise on the body temperature of the captive fish as well as the brain and muscle temperature, at the point of death, of a captive fish held in a tank whose water was cooled at a rate of 3.7° C. an hour.

The red-muscle temperature of ocean-caught skipjack was 34.7° C., between 8.0° and 9.1° C. above the ambient water temperature. The excess temperature of the red muscle decreased after the fish were caught; it remained low as long as the fish were held in captivity. Although their body temperature increased during prolonged strenuous exercise, it never reached the level of the body temperature of the ocean-caught fish. Brain temperature of the ocean-caught fish was between 29.0° and 30.1° C., 2.4° or 4.5° C. above ambient water temperature; the excess in white-muscle temperature was 8.6° C. when the ambient water was 25.6°, and 4.0° C. when the water was 26.6° C. The tuna that was subjected to slow cooling died rather suddenly when the water reached 13.2° C. (Three other skipjack did not die when (over)

9.15

EFFECT OF OXYTETRACYCLINE AND CHLORTETRACYCLINE ON SURVIVAL OF THE TREMATODE HETEROPHYES SP. IN THE FLESH OF MULLET CAUGHT IN BRACKISH EGYPTIAN WATERS

Hamed, M. G. E., and A. N. Elias (Food Technology Division, National Research Centre, Cairo, Egypt)
Journal of Food Science 36, No. 1, 67-69 (January-February 1971)

The mullet, Mugil cephalus, is found in brackish waters of Egypt. It serves as the most common intermediate host for the worms of Heterophyes [M. Nasr, J. Egyptian Med. Assoc. 24, 321 (1941)]. The authors experimented with the use of oxytetracycline (OTC) and chlortetracycline (CTC) to destroy this parasite in the flesh of the mullet. They dipped whole mullet and portions of the infected mullet tissue in OTC and CTC solutions of different concentrations ranging from 30 to 4,000 p.p.m. The amount of the antibiotics required to destroy the parasites in the flesh of the mullet was far greater than the amount that could be used on the fish for preservation purposes. The authors suggest that further research efforts should be expended in solving this difficult problem.
[2 tables, 6 references]

FTP

9.13

oceans amounts to 6.5×10^6 g., and that the amount of opal contributed to marine sediments annually is about 4×10^7 g. He believes that these productions values are significant even though they may be small compared to the estimates of annual opal fixation by the combined standing crops of marine diatoms and siliceflagellates of from 0.77×10^{16} g. to 16.1×10^{16} g.
[3 figures, 22 references] FTP

9.16

STUDIES ON THE OSMOREGULATION OF THE CHUM SALMON, ONCORHYNCHUS KETA (WALBAUM). III. THE TOLERANCE OF ADULT FISH REARED IN A SALT WATER POND TO FRESH WATER

Kashiwagi, Masaaki, and Ryuhei Sato (Department of Fisheries, Faculty of Agriculture, Tohoku University, Sendai, Japan)
Tohoku Journal of Agricultural Research 21, No. 1, 26-31 (March 1970)

The purpose of this study was to determine whether adult salmonids which had spent most of their life in sea water could live in fresh water. Chum salmon (25 months old, 22 months of which were spent in a salt-water pond) were transferred abruptly to fresh water.

The researchers found that the salt-water reared chum salmon lived a long time after being transferred to fresh water. During the first few days after the fish were transferred to fresh water, the water content of their blood increased and the average value of the freezing point depression of the blood decreased. The water content and average freezing point depression levels of the blood returned to normal levels in about 3 days after the fish had been transferred to fresh water.
[3 figures, 22 references]

FTP

9.13 (1.125)

cooled to 15° C.) Immediate examination showed that the brain, red-muscle, and white-muscle temperatures were 16.7°, 22.0°, and 19.0° C., respectively--the temperature excesses being just about the same as those for the ocean-caught fish.

The implications of these findings are discussed.
[5 figures, 2 tables, 8 references] LB

9.13
(1.70)

WATER AND ELECTROLYTE BALANCE IN ELASMOBRANCHS: EVIDENCE FOR AN ENDOCRINE CONTROL

Payan, P., and Jean Maetz (Lab. Physiol. Anim., Fac. Sci., Nice, France)
Chemical Abstracts 73, No. 21, 106795k (November 23, 1970)

9.12

THE INFLUENCE OF DISSOLVED OXYGEN AND CARBON DIOXIDE ON FISH SCHOOLING BEHAVIOR

McFarland, William N., and Sanford Moss
Final report 1 Apr 64-31 Dec 67, prepared by Cornell Univ., Ithaca, N.Y., 40 pp. (April 1968)
U.S. Government Research & Development Reports 71, No. 2, 35 (January 25, 1971)
Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. AD-715 113, PC$3.00, microfiche 95¢

Both field and laboratory-experimental data are presented to support a hypothesis relating group metabolism of fish schools to changes in school behavior. Specifically, it is shown that large schools of Mugil cephalus cause dramatic decline in environmental oxygen levels. These changes if sufficiently large are postulated to modify school behavior. Experimental manipulation of either oxygen or carbon dioxide is shown to have little effect on school behavior if the changes occur slowly. More rapid changes do not alter school structure, but do cause schools to avoid such changes. The means by which this may be accomplished and how it is transferred to group action is discussed. (Author) Reprinted

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9.1
(9.6)

THE PACIFIC OCEAN. VOLUME 7. BIOLOGY OF THE PACIFIC OCEAN. PART 2, THE DEEP-SEA BOTTOM FAUNA. PLEUSTON

Zenkevich, L. A.
Translation of monograph Tikhii Okeana. Vol. 7, Biologiya Tijhogo Okeana. Pt. 2, Glubokovodnaya Donnaya Fauna. Pleiston, Moscow 353 pp. (1969), by M. Slessers for the Naval Oceanographic Office, Washington, D.C.
U.S. Government Research & Development Reports 71, No. 2, 67 (January 25, 1971)
Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. AD-714 906, PC$6.00, microfiche 95¢

The volume contains a review of data on deep-sea bottom fauna and pleuston of the Pacific Ocean based on original data as well as on published results. The articles contain a new approach and new ways of description and interpretation of the material. (Author) Reprinted

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9.125 (9.17)(1.37)

linear over the range measured, the minute volume increased more rapidly than the differential pressure did. Oxygen consumption by resting fish increased during hypoxia; the increase was associated with increases in ventilation and differential pressure across the gills.

The oxygen cost of breathing was estimated from the increased oxygen consumption during hyperventilation. Comparing these estimates with estimates of the work done (using the pressure and volume measurements), the authors derived figures for the overall efficiency of the trout's pumping mechanism--about 10%.
[12 figures, 2 tables, 19 references] LB

9.13 ZONE ELECTROPHORETIC STUDIES ON THE PROTEINS OF TILAPIA MOSSAMBICA AND T. HORNORUM AND THEIR F_1 HYBRIDS, T. ZILLI, AND T. MELANOPLEURA

Chen, F. Y. (Tropical Fish Culture Research Institute, Malacca, W. Malaysia), and H. Tsuyuki (Fisheries Research Board of Canada, Vancouver Laboratory, Vancouver 8, British Columbia)
Journal of the Fisheries Research Board of Canada 27, No. 12, 2167-2177 (December 1970)

This paper reports on the starch-gel electrophoretic characteristics of the hemoglobins, muscle myogens, serum transferrins, and serum esterases from Tilapia mossambica, T. hornorum, T. zilli (mouth brooders), and T. melanopleura (substratum spawners). In addition, the mobility characteristics of lactate dehydrogenase (LDH) from 11 tissue of these four species of Tilapia are described.

The T. mossambica and T. hornorum showed virtually identical LDH zymograms; T. zilli was distinguished from T. melanopleura and from the first two species by the unique mobility difference of the skeletal muscle type subunit. The LDH subunit specific for the eye tissue was the major diagnostic feature that distinguished the mouth brooders and the substratum spawners.

Electrophoretic analyses of the hemoglobins and muscle myogens completely separated all four species of Tilapia; therefore, these protein groups are the groups of choice as diagnostic tools in the identification of these species. The authors found that the use of these proteins as diagnostic tools in the examination of the specimens of T. mossambica and T. hornorum in this study, showed that the specimens were not always biochemically uniform. This observation emphasized their (the proteins') further value in the selection of parental stocks for breeding purposes. [6 figures, 43 references] FTP

9.15 (9.3)(1.8) OCCURRENCE OF TOXIC BIVALVE MOLLUSCS DURING A GYMNODINIUM BREVE "RED TIDE"

Cummins, Joseph M., Abner C. Jones, and Alan A. Stevens (Gulf Coast Water Hygiene Laboratory, Environmental Protection Agency, Dauphin Island, Ala. 36528)
Transactions of the American Fisheries Society 100, No. 1, 112-116 (January 1971)

Extensive fish mortality has been associated with Gymnodinium breve "red tides" along the west coast of Florida. Toxicological evidence has strongly incriminated G. breve as being the primary source of two toxic components detected in oysters and clams exposed to increased numbers of G. breve. From August to November 1967, G. breve "red tide" conditions were reported from the mouth of Tampa Bay to Redfish Pass, south of Charlotte Harbor on the west coast of Florida. The present study examines the relationship of increased numbers of G. breve to the occurrence and distribution of toxic oysters and clams.

The most severe G. breve "red tide" conditions occurred during the first day of sampling. G. breve cell counts averaged 1500-2400 organisms/ml in the offshore waters, 300 organisms/ml in the surf zone, and 820 organisms/ml in Venice Inlet. Water collected offshore and from the head of the Inlet contained an ether-soluble substance that was toxic to mice. At this time a large number of dead fishes were observed lining the beaches and floating offshore. Hard clams (Mercenaria campechiensis) and sunray clams (Macrocallista nimbosa) collected from the head of Venice Inlet contained 270 and 140 mouse units of toxin per 100 g of meats, respectively. Oysters (Crassostrea virginica) collected south of Bird Island the same day contained 75 mouse units of toxin per 100 g of meats.

(over)

9.19 (7.49) TOXIC CHEMICALS--THE RISK TO FISH

Mawdesley-Thomas, Lionel E. (Huntingdon Research Centre, Huntingdon, Hunts., England)
New Scientist 49, No. 734, 74-75 (January 14, 1971)

The author evaluates the methods used to test the toxicity to fish of new chemical compounds designed for release into the environment.

Both the British and the American procedures for assessing the risk to fish of potentially toxic substances are inadequate. First of all, the tests should cover a longer period of time. Once the LD_{50} has been established, the threshold concentration of the toxic chemicals on the behavioral patterns of a given fish species must also be considered, as must the possibility that the fish may concentrate the chemical in its tissues or that two or more chemicals may have a synergistic effect. Blood levels should be determined, autoradiographic studies conducted, and the levels and the persistence of pesticides in the tissues evaluated. All test fish should be autopsied and the principal organs examined histologically. The fish used for acute toxicity testing in the United Kingdom (the harlequin) should be replaced by a larger fish for which adequate background data are available--the harlequin is unsuited for long-term studies involving hematological and histological examinations. Salmonidae, which are more sensitive to aflatoxins and other hepatotoxins than are other biological systems and are 400 times more sensitive to DDT than is the mouse, are more suitable. Finally, since the biologist must be the prime investigator of the toxicity of pesticides to fish, he should be required to give more specific information about the energy system of the target pest itself so that the chemist can be asked to investigate a particular system. [1 table] LB

9.19 (9.16) LAKE ERIE: POLLUTION ABATEMENT, THEN WHAT?

Hubschman, Jerry H. (Wright State University, Dayton, Ohio 45431)
Science 171, No. 3971, 536-540 (February 12, 1971)

Even if all pollution violations were automatically eliminated, continuous changes in the quality of the water in Lake Erie might be expected. Too, if all toxic industrial wastes were reduced or eliminated, we would still be faced with the continuing phenomenon of eutrophication. Surface runoff is, and will continue to be, a major contributor to the process of eutrophication. The leaching of agriculture fertilizers and natural erosion (producing silt) contribute greatly to the process. Eutrophication, therefore, is a natural process. But, the disturbing rate of increase, related to man's activity in the Lake Erie watershed, is of considerable concern. Much work remains in identifying the cause and effect relationship of eutrophication and in developing new corrective measures.

Corrective measures for municipal sewage and toxic industrial waste pollution will be developed if given proper priority. Erosion, siltation, and agricultural runoff are more difficult to correct for various political and technological reasons, and may be expected to be major contributors to eutrophication long after waste disposal problems are under control. The author proposes, therefore, that attempts be made to turn the problem into an advantage by a program directed at active removal of biomass with subsequent reduction in accumulated organic reserves.

Possible approaches to the removal of biomass are the direct harvest of planktonic algae (for stock feed, fertilizer, and food additives) and the use for food purposes of the so-called rough fish. The basis of the author's proposal is the large-scale harvest of suitable benthic invertebrate species. There are now no

(over)

9.13 (9.3)(1.8)

On the third day of sampling, coquinas (Donax variabilis) collected from the surf zone south of Midnight Pass were highly toxic, containing 550 mouse units per 100 g of meats. The toxicity of the coquinas was the highest ever detected by this laboratory in bivalve molluscs exposed to G. breve "red tide" conditions.

Seawater, oyster, and coquina samples collected from the Venice area in the absence of G. breve "red tide" conditions did not contain detectable amounts of toxin.

Our observation of the distribution of toxic molluscs was also consistent with an earlier observation, that bivalve molluscs inhabiting waters of relatively high salinity near the Gulf were more prone to intoxication with G. breve toxin than were those molluscs inhabiting estuarine waters of relatively low salinity (Cummins et al., 1967). Knowledge of this toxicity distribution pattern should be helpful to those responsible for the public health management of the shellfish growing areas as well as to those persons conducting ecological studies of G. breve "red tides." The inclusion of relatively high salinity sampling stations in any shellfish toxicity surveillance program might provide earlier warning and more extended monitoring of shellfish toxicities than could be provided by a network of relatively low salinity, estuarine sampling stations.

[1 figure, 1 table, 14 references] Reprinted in part

9.19 (9.16)

benthic species in Lake Erie worth developing. He, therefore, proposes a program of worldwide screening of species for possible controlled production in waters of the lake. Such a program would use the successful approach established by the agricultural experimental stations over the past 50 years. By this approach (1) species of suitable life-history characteristics and utilization potential would be selected, (2) breeding programs would be carried out to develop the appropriate features of the basic stocks, and (3) genetic manipulations would be carried out to develop the physiological limits of temperature tolerance, osmotic limitations, and growth characteristics.

[1 figure, 27 references] FTP

9.16 A PROGRAM OF RESEARCH FOR THE CATFISH FARMING INDUSTRY
(1.92)

Anonymous
Report prepared for Bureau of Commercial Fisheries, Ann Arbor, Mich., 233 pp. (September 1970)
U.S. Government Research & Development Reports 71, No. 2, 22 (January 25, 1971)
Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. COM-71-00049, PC$3.00, microfiche 95¢

The study reports on the history and current state of the industry, improvement of harvesting methods and equipment, and present and future markets including pay-lakes and restaurants. Research results are reported as regards catfish processing and feedstuffs and diets for catfish. (EDA Abstract) Reprinted

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9.19 THE UNSEEN DANGERS OF OIL

Loftas, Tony
New Scientist and Science Journal 49, No. 737, 228 (February 4, 1971)

At the FAO Technical Conference on Marine Pollution and Its Effects on Living Resources and Fishing (held in Rome recently), M. Blumer of the Woods Hole Oceanographic Institution stated that all crude oils and oil products containing hydrocarbons that boil between 300° and 500° C. are potentially carcinogenic. Although the low-boiling aromatic hydrocarbons are immediately toxic to marine life, they usually evaporate quickly once the oil is exposed to the atmosphere; in contrast, the higher boiling fractions (some of which are similar to the alkylated 4- and 5-ring aromatic hydrocarbons in tobacco tars) are present in both freshly spilled oil and the tarry residues that remain after considerable weathering. The use of detergents to break up oil spills only makes the oil droplets into a size that fish can conveniently eat. Excessive amounts of these substances in fish that are used as seafood would probably be noticeably because of the odor, taste, or color changes they bring about in the fish flesh; but processes presently used to extract fish protein concentrate would not eliminate them. In addition, Blumer said, the stranded lumps of tar or finely dispersed oil on recreational beaches may well be a severe public health hazard to people who continuously come in contact with them.

At the same conference, Bruce Halstead of the International Biotoxicological Center at the World Life Research Institute, Colton, California, cited instances of tumors' apparently being induced in marine animals by organic petrochemical wastes. These papers led the author to question the desirability of detergents' and other dispersants' being used as a cosmetic dressing on oil spills--although the coastal amenities may be preserved thereby, the effects on marine life and on human users of both the beaches and the marine biota could be disastrous. LB

Anonymous
Chemical Engineering 78, No. 3, 60-67 (February 8, 1971)

This article was prepared by the staff of the Journal. It defines ocean pollution, then examines some of the present practices that cause pollution; the present and future problems; and the legal, technical, and economic constraints on waste disposal in the ocean environment.

[2 figures, 3 tables, 10 references] FTP

(1.81)

U.S. Patent 3,552,357
Quayle, Daniel B., and Trevor P. Clark (pat.)

Oyster cultches are made by mixing in the dry state hydraulic cement, lime, antislime lubricant, gypsum, and fiber binding material and pressing the mixture into cultches under high pressure. The mixture after compression is saturated with a 'catalyzed' solution (6% calcium chloride). FTP

9.19 POLLUTION OF THE ENVIRONMENT

RIC Reviews 3, No. 2, 85-134 (October 1970) (The Royal Institute of Chemistry, 30 Russell Square, London WC1B 5DT, England)

CARD A

Twice yearly this journal publishes reviews of interest to the chemist who has no special knowledge of the field under review but who wants to keep abreast of the growth of chemistry as a discipline. In this issue, three reviews are presented under the stated general title as follows:

"Pollution of Soils," by I. J. Graham-Bryce, and G. G. Briggs (Rothamsted Experimental Station, Harpenden, Herts., England), pp. 87-104.

In Britain, residues of organochlorine insecticides and some other pesticides already present in soils will take several years to disappear, even without further additions. Applying materials such as activated carbon to contaminated soils lessens their effects, but such treatments are probably not practical on a large scale and little can be done to speed up the removal of persistent pesticides. Changing to nonpersistent pesticides (such as the organophosphorus and carbamate insecticides) together with more careful use of persistent pesticides may be the only ways to reduce residues in the soil. The organophosphorus and carbamate insecticides are generally more toxic to mammals than are the organochlorine materials and are therefore more dangerous to handle. The persistence of some materials in soils is shown in the table that follows:

(over)

9.2 ASPECTOS ECONOMICOS DE LAS INDUSTRIAS CONSERVERA-HARINERA Y
(1.013)(6.130) CAMARONERA DE VENEZUELA
(3.330) [ECONOMIC ASPECTS OF THE CANNING, FISH MEAL, AND SHRIMP INDUSTRIES OF VENEZUELA]

Nascimento, Ulpiano F., and Bartolomé Rojas Cardona
Informe Técnico No. 20, 31 pp. (1971)(Caracas, Venezuela) (In Spanish; English summary)

An oriented analysis of the idle capacity in the canning-fish meal and the shrimp industry is made, and information is given on the factors that have produced this underutilization. [Idle production capacity is, in objective terms, the fixed invested capital designed for the production of goods and services (installations, machinery, equipment, etc.) that is not used, or is underused, during a given period owing to various internal or external factors.]

The most relevent aspects characterizing these industries are described.

The relative position of the two activities in the context of the overall economy of the fisheries sector are discussed. From this comparison, the greater importance is seen of the canning-fish meal industry over the processing shrimp industry, with regard to the capital involved, manpower and value, and to the greater influence of the national economy.

An analysis is made to establish comparisons between the production and the investments and also of the growth rates of the two activities under study. The relationship capital-product and the growth rate in relation to the canning-fish meal industry could not be established because of lack of data; however, simplified estimates are made. These show that increase in investment has not kept pace in recent years with increase in production.

(over)

9.19 POLLUTION OF THE ENVIRONMENT

RIC Reviews 3, No. 2, 85-134 (October 1970)

CARD B

"Water Pollution," by H. Fish (Thames Conservancy, London WC2, England), pp. 105-117.

In this review, the author discussed only the pollution of water resources--inland waters in streams, rivers, lakes and ponds, the groundwaters in permeable strata underground, and the tidal waters of estuaries and creeks. He considered the practical aspects of water pollution and its control in England and Wales. [3 figures, 6 references]

"Air Pollution," by C. F. Barrett (Ministry of Technology, Warren Spring Laboratory, Stevenage, Herts., England), pp. 119-134.

In this review, the author discusses atmospheric pollution arising from the activities of man. The various sections of the report cover grit and dust, aerosols, gases, smoke and sulfur dioxide, secondary pollutants (products of reactions in the atmosphere), sulfur compounds, carbon monoxide, carbon dioxide, and possible effects on climate. The author suggests that if present trends in pollution continue, significant changes will be made to the radiation affecting the earth. The effect of these changes on climate is not possible to assess with certainty, but may be important. [3 figures, 7 tables, 5 references] FTP

9.2 A LINEAR-PROGRAMMING SOLUTION TO SALMON MANAGEMENT
(9.1)

Rothschild, Brian J. (Center for Quantitative Science and Fisheries Research Institute, University of Washington, Seattle, Wash. 98105), and James W. Balsiger (Fisheries Research Institute, University of Washington)
Fishery Bulletin 69, No. 1, 117-139 (January 1971) (U.S. Department of Commerce, NOAA, National Marine Fisheries Service, Publications Services Staff, 1801 North Moore St., Arlington, Va. 22209)

A linear-programming model was constructed to allocate the catch of salmon among the days of the salmon run. The objective of the model was to derive a management schedule for catching the salmon which would result in maximizing the value of the landings given certain constraints. These constraints ensured that cannery capacity was not exceeded, and that escapement of both male and female fish was "adequate." In addition to considering the allocation of the catch in the primal problem, the dual problem considered the shadow prices or marginal value of the various sizes of fish, eggs, and cannery capacity, thus enabling the manager to view his decisions in light of the marginal values of these entities. As an example, the model was applied to a run of sockeye salmon in the Bristol Bay system. In the particular example, which was chosen to replicate the 1960 run, the additional value of the catch owing to optimality amounted to an ex-vessel value of a few hundred thousand dollars. In addition it appeared that the required processing time could be reduced by several days. The optimum allocation was obtained through conformance to the linear-programming model. The cost of this conformance was not, however, determined.
[9 figures, 3 tables, 9 references] Authors' abstract

9.19 (9.4)

VORKOMMEN POLYZYKLISCHER, AROMATISCHER KOHLENWASSERSTOFFE IN KÜSTENGEWÄSSERN UND DEREN MÖGLICHE AUSWIRKUNGEN AUF DIE MENSCHLICHE GESUNDHEIT
[PRESENCE OF POLYCYCLIC, AROMATIC HYDROCARBONS IN COASTAL WATERS AND THEIR POSSIBLE EFFECTS ON HUMAN HEALTH]

Suess, Michael J. (WHO Regional Office for Europe, 8 Scherfigsvej, 2100 Copenhagen, Denmark)
Archiv für Hygiene und Bakteriologie 154, No. 1, 1-7 (June 1970) (In German; English, French, and Spanish summaries) (Urban & Schwarzenberg, Pettenkoferstrasse 18, 8 München 15, Germany)

At the Fourth International Colloquium on Oceanographic Medicine (Naples, Italy, October 2, 1969), the author pointed out that carcinogenic polycyclic aromatic hydrocarbons are being found in coastal waters not only near heavily populated areas but in remote, unpopulated zones where little if any human activity occurs. Although the endogenic synthesis of flora seems to be a major contributor to the concentration of polycyclic aromatic hydrocarbons (PAH), industrial and municipal effluents and atmospheric precipitation may add to the effect. Despite the fact that marine fauna are known to concentrate carcinogenic PAH, no clear evidence exists that the waste effluents polluting our seafood pastures have become an actual cancer hazard to the general population. Nevertheless, it behooves us to view these waste streams and their marine inhabitants with concern so that we can forestall possible future complications.
[4 tables, 46 references]

LB

9.3 (9.4)

THE ECUADOR FISHERIES DISPUTE (A NEW APPROACH TO AN OLD PROBLEM)

Lecuona, Daniel C. (Member, Buenos Aires and Tucuman Bar Association, Argentina)
Journal of Maritime Law and Commerce 2, No. 1, 91-114 (October 1970)

The author discusses the dispute, chiefly between the United States and Ecuador and Peru, over fishing rights involving the tuna fisheries in the southeastern part of the Pacific Ocean. He states that this particular dispute involves different legal principles upon which the parties to the conflict base their claims and that this difference makes it difficult to achieve an understanding on the basis of legal considerations alone. Some of the author's conclusions are

1. International law relative to territorial waters and fisheries has not evolved from rules of reason or of legal principles as much as it has from a struggle between national interests in which the large and small nations pursue similar goals with the different means at their disposal.
2. The positions adopted by the several nations involved in the fisheries issue vary according to the strategic and economic considerations of each.
3. The matter of breadth of the territorial sea is an unsettled question in international law and there appears to be widespread belief that a claim to a territorial sea 12 miles wide is not contrary to international law.
4. Coastal states have exclusive rights over fisheries in the adjacent sea but international consensus as to the breadth of the area subject to such rights is questionable.
5. More than a dozen countries claim distances far exceeding the maximum of 12 miles recognized by other nations; the author suggests that these claims may seem somewhat excessive at present but that they are not altogether unfounded.

FTP

9.19

Compound	Use of compound	Persistence in soils*	Normal rates of use per application (kg. ha^{-1})
Methyl bromide	Fumigant for soil sterilization	<1 week	1,000
Ammonia	Fertilizer	3 weeks	up to 100
2,4-D	Foliar herbicide	1 month	1
Disulfoton	Systemic organophosphorus insecticide	6 weeks	1-2
Chlorfenvinphos	Organophosphorus soil insecticide	6 months	1-4
Diuron	Soil-applied substituted urea herbicide	8 months	0.5-2
Simazine	Soil-applied triazine herbicide	1 year	0.5-1.5
Dieldrin	Soil and crop organochlorine insecticide	>3 years	1-5
DDT	Soil and crop organochlorine insecticide	>5 years	1-5

* The persistence of the materials in soils is given in the approximate time for at least 75% of the added dose to disappear.

[2 illustrations, 2 tables, 8 references]

Continued on Card B

9.2 (1.013)(6.130)(3.330)

Concerning the shrimp sector the analysis was incomplete owing to lack of data. The relation capital product was not calculated although a direct comparison between the values obtained shows that the return on invested capital was quite low in recent years. The growth rate of the same variables is different: higher in investment (23.7% annually) and less in production (4.4% annually).

Finally, an indicator is given of the idle capacity in the two activities considered, which, according to the estimates made, and not considering the fixed assets of the closed plants, was 31% per annum in the canning-fish meal industry and 72% per annum in shrimp, again not considering the fixed assets of the closed plants.
[5 figures, 13 tables, 7 references]

Authors' summary

Reprinted (Author)

The report is one of a series of studies in economic and social development prepared for the New England Regional Commission. The study, directed by the Commission staff, broadly surveys New England's human resources and makes recommendations to the Commission on public policy in the field of human resources.

Report for the New England Regional Commission in cooperation with Robert R. Nathan Associates, Inc., Washington, D.C., 111 pp. (October 1969)
U.S. Government Research & Development Reports 71, No. 2, 15 (January 25, 1971)
Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. COM-71-00055, PC$3.00, microfiche 95¢.

9.2 HUMAN RESOURCES: KEY TO REGIONAL GROWTH

Butler, Phillip A. (Bur. Commer. Fish. Biol. Lab., U.S. Dept. of Interior, Gulf Breeze, Fla.)
Chemical Abstracts 73, No. 5, 24222g (August 3, 1970)

9.19 SIGNIFICANCE OF DDT RESIDUES IN ESTUARINE FAUNA

9.3 (9.4) THE THEORY AND PRACTICE OF INTERNATIONAL FISHERY DEVELOPMENT-MANAGEMENT

Chapman, Wilbert McLeod (Marine Resources, Ralston Purina Company, San Diego, Calif.)
San Diego Law Review 7, No. 3, 408-454 (July 1970)

The author, in this article, attempts a cursory glimpse at the working of the complex international machinery for fishery development-management to see how well the machinery is working and whether it should be strengthened and expanded, or whether it should be discarded and a new start be made with new machinery established within the United Nations framework. He examines eight different types of international fishery bodies, commissions, and agreements [involving 24 organizations and 12 or so agreements] and evaluates them as to the success of their efforts. From this examination, the author concludes:

1. Fishing effort throughout the world is growing more rapidly than the means of its governance.
2. The existing international fisheries bodies and commissions have contributed much toward mitigating fishery disputes and to the understanding of the ocean, the resource, and fishing effort [the information needed to resolve diplomatic and political problems relative to the fisheries].
3. No particular form of international fishery body appears unique in its efficiency in dealing with international fishery problems.
4. Scientific data on the fisheries and the environment is needed to understand how to deal with each fishery problem.
5. On the basis of scientific data, agreement can be reached on the amount of fishing effort to be permitted in a particular fishery.

(over)

9.3 (9.4) TWO NEGLECTED PROBLEMS IN DRAFTING REGIMES FOR DEEP OCEAN RESOURCES

Goldie, L. F. E. (Professor of International Law, Naval War College, Newport, R.I.)
American Journal of International Law 64, No. 5, 905-919 (October 1970)

Proposals for regimes to govern deep-ocean resources generally have a common interest in achieving a tolerable system for protecting and distributing the wealth of the bed and subsoil of the high seas beyond national jurisdiction. The author suggests, however, that there are two essential, if "technical" matters that tend to be overlooked. The first matter relates to the legal quality of the title, that is, the bundle of rights conferring jurisdiction and control short of "sovereign rights," which an administering state may exercise within the area of its claim or "zone of special jurisdiction" for the period assigned and with respect to the resources made the subject of its rights. The second omission [matter] concerns the means of assuring transnational validity to titles to resources won from seabed areas, once they have moved across international boundaries in the ordinary course of commerce. To illustrate these points the author reviewed aspects of the regime proposed by the Stratton Commission Report [Commission on Marine Science, Engineering and Resources, Our Nation and the Sea: A Plan for National Action (1969). This report was accompanied by eight panel reports included in three volumes: vol. 1, Science and Environment (1969); vol. 2, Industry and Technology; Keys to Ocean Development (1969); vol. 3, Marine Resources and Legal-Political Arrangements for Their Development (1969).] [50 footnotes] FTP

9.3 (9.2)(9.4) SOCIAL GOALS, PROBLEM PERCEPTION, AND PUBLIC INTERVENTION: THE FISHERY

Arnold, Victor L. (Marine Studies Center, University of Wisconsin, Madison, Wis.), and Daniel W. Bromley (Department of Agricultural Economics and Center for Resource Policy Studies and Programs, University of Wisconsin)
San Diego Law Review 7, No. 3, 469-487 (July 1970)

The authors first discuss eight possible objectives for fisheries management, none of which are necessarily mutually exclusive and several of which are internally inconsistent. These are (1) to maximize the sustained yield of a fishery, (2) to produce a given quantity of fish annually into perpetuity, (3) to maximize fishing fleet profits, (4) to maximize long-range fishing capability, (5) to minimize the cost devoted to catching fish, (6) to minimize cost devoted to total food production, (7) to use fish as a source for foreign trade, and (8) to counteract economic decline of fishing communities. The authors then (1) relate the objectives of the legislated institutional change--the 9-mile contiguous zone--to the stated goals for fisheries management and (2) discuss the entire process of change in the context of a social decision model (defined in the introduction of their article).

In this case study, the authors state that the sufficiency test was not applied in reaching the decision to establish the 9-mile contiguous zone. (By a sufficiency test the authors mean: (1) develop hypotheses regarding the performance of both the private and public sector, (2) establish a basis for comparison of the situation with and without intervention, (3) identify intervention alternatives (bearing in mind that public intervention may be only one of several corrective

(over)

9.3 (9.19) THE CANADIAN ARCTIC WATERS POLLUTION PREVENTION ACT: NEW STRESSES ON THE LAW OF THE SEA

Bilder, Richard B. (University of Wisconsin, Madison, Wis.)
Michigan Law Review 69, No. 1, 1-54 (November 1970)

In June 1970, the Parliament of Canada enacted the Arctic Waters Pollution Prevention Act to prevent pollution of areas of the Arctic waters adjacent to the mainland and islands of the Canadian Arctic. The Act asserts Canada's jurisdiction to regulate all shipping in zones up to 100 nautical miles off its Arctic coasts. The author states that the Canadian Pollution Prevention Act is of interest for several reasons: (1) It opens up a new round in the historic struggle over freedom of the seas; and (2) It brings up complex questions of international law regarding the legal regime of Arctic waters, the concept of contiguous zones, the status of waters within archipelagoes, and the doctrines of innocent passage and international straits.

Furthermore, the author states that the Act illustrates the perception of an increasing number of states that existing international law and international arrangements are inadequate to protect their legitimate interests, and the strong pressures within such states for unilateral action to remedy these perceived deficiencies.

The article discusses the various aspects of the Act. The Appendix contains the text of the Canadian Arctic Waters Pollution Prevention Act.
[124 footnotes] FTP

9.3 (9.2)(9.4)

aids), (4) compare empirical evidence, and (5) make recommendations.) As the authors viewed it, the problem involved in the fishery situation was the efficiency gap between domestic and foreign fishing fleets. Because the problem was not clearly specified by the constituents, the legislative branch, then, perceived the problem unclearly. Furthermore, the authors indicate that, because Congress had never articulated specific goals for domestic fisheries, it had enough latitude to transform the unclear problem into one relating to conservation and national prestige. The authors argued that the type of action that was considered would have been better conceived and implemented if it had been accompanied by a social decision model similar to the one they described in this article. This model, they submit, should present the best practical information on the alternatives and their consequences, should afford affected individuals and groups an opportunity to become aware of the likely impacts of the alternatives, should offer the parties affected opportunity for participation in the decision process, and should permit the feedbacks of information so that initial decisions can be modified.
[35 footnotes] FTP

9.3 (9.4) A LEGAL REGIME FOR DEEP SEA MINING

Mero, John L. (Ocean Resources, Inc., La Jolla, Calif.)
San Diego Law Review 7, No. 3, 488-503 (July 1970)

The author first describes the deposits of the deep sea and their apparent potential worth to society, then outlines a proposed legal regime for deep-sea mining. [26 footnotes] FTP

9.3 (9.19) OFFSHORE OIL SPILLS: AN EVALUATION OF RECENT UNITED STATES RESPONSES

Nanda, Ved P. (University of Denver Law Center), and Kenneth R. Stiles (University of Denver, College of Law, Denver, Colo.)
San Diego Law Review 7, No. 3, 519-540 (July 1970)

There are three problem areas relative to offshore oil spills: (1) The nature of laws, regulations, and procedures for the optimum preventative steps; (2) The nature and effectiveness of the prescribing, applying, and enforcing machinery; and (3) Scientific and technological expertise and institutional structures necessary for restorative purposes (after a disaster occurs). This paper discusses the responses (executive and legislative) of the United States in the cases involving oil well blowouts in the Santa Barbara and Gulf of Mexico areas; and analyzes the institutional and procedural aspects of the U.S. responses.

In their appraisal and recommendations, the authors suggest that to minimize the oil pollution menace unilateral, bilateral, regional, and international preventative steps will have to be taken. Unilateral steps will be essential in dealing with pollution of the seas. The authors describe a rough model in which each nation should establish an Offshore Resource Agency. The function of the Agency would be to regulate and supervise the production of offshore oil resources. The offshore legislation could be fruitfully modeled on the United States legislation. Also, each state should establish a board on oil pollution that would have the operational responsibility to monitor and control oil spills.
[162 footnotes] FTP

9.3 (9.4)

6. On the basis of such determinations (item 5), it is possible for nations to arrange a division of the maximum sustainable yield among themselves.

7. For those nations that do not have the resources or capability to do the necessary scientific fishery research, the work should be carried out by an appropriate international agency (such as FAO) or by other bodies whose credibility and competence are accepted.

8. Nations which depend upon foreign sources for their fish supply must accept financial and other responsibility for husbanding the food resources of the oceans of the world.

9. A major overhaul of the United Nations' machinery for dealing with ocean-oriented problems is needed, including development of better relations among the ocean activities of WMO, FAO, and UNESCO and major strengthening of the funding support for the whole United Nations' ocean activity.

10. The United States is not as effective as it might be in dealing with ocean-oriented problems because the responsibility for such activities is diffused among many federal agencies.

11. The objective of maximizing the net economic yield from high seas fishery is a second-order problem of high complexity; the first-order problem of maximizing the physical yield of food from the sea should be solved first.

12. Peaceful means must be found to settle fishery disputes if industries are to develop as desired. Scientists should work together under international auspices to solve the natural history problems; the administrators and diplomats, then, should use the agreed scientific results as a foundation for negotiations of the political, economic, and social aspects of the fishery problems.
[83 footnotes] FTP

9.3 (9.4) FISHERIES AND THE NEW CONVENTIONS ON THE LAW OF THE SEA

Christy, Francis T., Jr. (Resources of the Future, Inc., Washington, D.C.)
San Diego Law Review 7, No. 3, 455-468 (July 1970)

The author discusses five points that might be considered by those who are preparing themselves for the new conferences on the law of the sea. These points involve: (1) The complexity of the fisheries and the inadequacy of knowledge; (2) The over emphasis on the seabed and under emphasis on fisheries; (3) A new context for decisions, i.e. the character of today's decision-making machinery; (4) Patterns of distributions of the sea's wealth in fisheries; and (5) The need for new principles of law.

The author summarizes his report by saying that he raised the foregoing five points because it was not at all apparent to him that either the states of the world or their diplomats are ready to deal with the fishery issues that are likely to be raised at the reopening of the Geneva Conventions. He suggests (though does not expect) a delay in the reopening so that the issues and alternative solutions can be thoroughly studied. [17 footnotes] FTP

9.3 (9.19) INTERNATIONAL AND NATIONAL REGULATION OF POLLUTION FROM OFFSHORE OIL PRODUCTION

Krueger, Robert B. (Nossaman, Waters, Scott, Krueger, and Riordan, Los Angeles, Calif.)
San Diego Law Review 7, No. 3, 541-573 (July 1970)

This article discusses the international and national regulation of pollution from offshore oil production. [138 footnotes] FTP

9.3 (9.4) SOME RECENT DEVELOPMENTS CONCERNING FISHING AND THE CONSERVATION OF THE LIVING RESOURCES OF THE HIGH SEAS

Schaefer, Milner B. (Institute of Marine Resources, University of California, San Diego, Calif.)
San Diego Law Review 7, No. 3, 371-407 (July 1970)

Apparently the provisions of the Convention on Fishing and Conservation of the Living Resources of the High Seas and the provisions concerning fishing in the other 1958 Conventions [Four Conventions were adopted at the International Conference on the Law of the Sea held in Geneva in 1958 concerning the High Seas, the Territorial Sea and the Contiguous Zone, the Continental Shelf, and Fishing and Conservation of the Living Resources of the High Seas] do not provide an entirely satisfactory basis for resolving some international fishery problems. This fact is evidenced by the growing, widespread demand for a new international conference on the law of the sea and by the recent practices of nations dealing with fisheries claims and disputes outside of the provisions of the 1958 Conventions. In this article, the author reviewed the background to the 1958 Conventions as it applies to fisheries, and reviewed the provisions of the Conventions in relation to recent activities of nations in international fishery affairs, with particular emphasis on the practice and policy of the United States.

The author concludes that any new international conference on the law of the sea will probably reexamine many provisions relative to fisheries already adopted by the 1958 Conventions including the following: the outer limit of national jurisdiction over the resources of the seabed (Continental Shelf); definition of the living resources appertaining to the Continental Shelf; the definition of "conservation"; the nature of the special rights of the coastal state in conservation of

 (over)

9.3 THE BACKGROUND OF THE DOCTRINE OF THE CONTINENTAL SHELF AND THE OUTER CONTINENTAL SHELF LANDS ACT

Krueger, Robert B. (Nossaman, Waters, Scott, Krueger, and Riordan, Los Angeles, Calif.)
Natural Resources Journal 10, No. 3, 442-514 (July 1970)

This part one of a two-part article reviews the historic and legal background of the doctrine of the Continental Shelf and the Outer Continental Shelf Lands Act. The Appendix contains the texts of the Submerged Lands Act, the Convention on the Territorial Sea and the Contiguous Zone, the Truman Proclamation on the Continental Shelf, the Outer Continental Shelf Lands Act, and the Convention on the Continental Shelf. [4 figures, 191 footnotes]

AN EVALUATION OF THE PROVISIONS AND POLICIES OF THE OUTER CONTINENTAL SHELF LAND ACT
Krueger, Robert B., Ibid. 763-810 (October 1970)

This part two evaluates the provisions of the Act. The author examined the administration of the Outer Continental Shelf Lands Act of the United States with a view toward determining whether their administration provided for the "maximum benefit to the general public." [174 footnotes] FTP

9.6 (9.19) WATER, HEALTH AND SOCIETY, SELECTED PAPERS BY ABEL WOLMAN

White, Gilbert F. (ed.)
Published by Indiana University Press, Bloomington and London, 1969, xii + 400 pp., illus. $15
Reviewed by Daniel A. Okun (Department of Environmental Sciences and Engineering, School of Public Health, University of North Carolina, Chapel Hill, N.C. 27514)
American Journal of Tropical Medicine and Hygiene 20, No. 1, 165-166 (January 1971)

Forty-six years ago, Dr. Wolman read a paper "Values in the Control of the Environment"; 31 years ago he delivered the keynote address at the first annual convention of what is now the Water Pollution Control Federation. From that first paper until the present, he has authored 184 papers concerned with the philosophy and the practice of environmental management. This book contains only 32 of them. But they cover a wealth of technology, lore and philosophy. Some of the subjects dealt with are public water supply in the service of man, including fluoridation; stream cleanliness; flood protection; the economics of water and water resources policy; water supply and water resources planning abroad; the reclamation of wastewaters for industrial water supply; disposal of radioactive wastes; and the role of professionals in managing the environment.

The reviewer says that, even though the book has no index, it is an invaluable reference work. LB

9.7 [COMMUNICATING SCIENTIFIC INFORMATION]

Feldman, Edward G.
Journal of Pharmaceutical Sciences 59, No. 11 and 12, I (November-December 1970)

In the last two issues of the year, the journal's editor comments on the process and the procedures of communicating scientific and technical information.

"Pollution of the Printed Word."

The November editorial deals with the dissemination of scientific information to scientists. It surveys the present overtaxed, incredibly slow system of communicating scientific information. It bemoans the slow, methodical method of processing scientific reports as an anachronism in a world of instant communication and deplores the rusty, out-of-step, even somewhat inflexible means the scientific community still uses to disseminate information to its members--a community that is apparently unable to change with the changes it is helping to produce. Although the problem of timeliness has often been defined, the solution has yet to be delineated. One possible solution is the growing practice of communicating technical findings directly to the public. However, the editor views this trend with concern, for, he says, the superficial treatment of information provided to an unknowing public can hardly substitute for the critical, peer-group review and evaluation of detailed data. Other, more feasible solutions seem to be inordinately slow in coming.

Most technical publications developed initially, and continue to exist, to serve (1) as an outlet for the scientist who has information to convey and (2) as a source for those who desire to keep abreast of knowledge developing in a particular area. Since the journals exist as a service to readers as well as authors, the reader should be given a prominent voice in their evolution, improvement, or

 (over)

9.3 OCEAN POLLUTION: AN EXAMINATION OF THE PROBLEM AND
(9.19) AN APPEAL FOR INTERNATIONAL COOPERATION

Busch, Douglas D., and Edward I. Mears (San Diego Law Review, University of San Diego, San Diego, Calif.)
San Diego Law Review 7, No. 3, 574-604 (July 1970)

This article appeared in the "Law Notes" section of the journal. The authors discuss the various problems relative to the use of the seas and waterways for waste disposal and suggest a program for community and international action for the control of ocean pollution. [94 footnotes] FTP

9.19 POISONOUS METAL MERCURY DISCOVERED IN VARIETY COMMON FOODS IN CANADA

Anonymous
Can. Fd Inds 41, No. 11, 21 (1970)
BFMIRA 24, No. 3, Abstract No. 719, 154 (March 1971)

This is a short account of tests by the University of Toronto on a variety of foods. "Significant" levels of mercury were found in wheat, flour, white bread, long grain rice, skim milk powder, cheese, tea, beef hamburger, beef liver, pork liver, calf liver, fish and poultry. Some figures are quoted, all of which are above the World Health Organization's tolerance level of 0.05 parts of mercury per million. Reprinted

9.7

change. Their goals must be defined and modified to reflect their real uses and purpose. To this end, those who use technical periodicals should be given the opportunity to consider if and how the publication can better serve them, how it can be more selective and more effective, and how it can more efficiently disseminate the products of the scientific community.

"Too Isolated and Aloof"

The December editorial deals with some of the problems associated with disseminating scientific information to the public. It attributes the American public's growing dissatisfaction and disenchantment with science to the scientific community's less-than-whole-hearted effort to keep the public informed of its activities and goals. The trend of those who foot the major part of the bills to put money into the delivery of results rather than into basic research indicates that the scientific community has failed to put itself into the right context--it has become too isolated and aloof to adequately detail the impact, achievements, and necessity of basic research to those who reap the benefits--and suffer the consequences--of technological activity.

The author of this editorial points to the need for scientists to work hand in hand with both the mass media and the professional publications. He cites the reporting of such stories as the development of the artificial heart and the human heart transplants as examples of undesirable exaggeration and of lack of realism and objectivity that can even further erode public opinion. He suggests that new channels be opened from the scientific community to the public sector. One way of opening such a link is through the scientists' concerted efforts to make available their time, expertise, and understanding to those in the mass media who are trying to present an honest, objective analysis of scientific research.

9.3(9.4)

the living resources in the contiguous high seas; the rights and duties of distant-water fishing nations; and means of settlement of disputes over conservation matters and over rights of fishing. [106 footnotes] FTP

9.5 DEVELOPMENT ACTIVITIES IN THE MARINE ENVIRONMENT
OF THE COASTAL PLAINS REGION

Anonymous
Report prepared by the Coastal Plains Center for Marine Development Services, Washington, D.C., 52 pp. (1970) Paper copy available from Coastal Plains Regional Comm., 2000 L Street, N.W., Suite 414, Washington, D.C.
U.S. Government Research & Development Reports 71, No. 2, 15 (January 25, 1971)

The Directory lists individuals, institutions and organizations in the Coastal Plains Region (No. Carolina, So. Carolina, Georgia) involved in marine research and development activities. Includes over 500 individuals who in 1970 were engaged in marine related activities and their associated institutions. (Author) Reprinted

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9.3 RECENT DEVELOPMENTS IN THE LAW OF THE SEAS: A SYNOPSIS

Harris, Michael B., and Anthony Lovett (San Diego Law Review, University of San Diego, San Diego, Calif.)
San Diego Law Review 7, No. 3, 627-673 (July 1970)

The authors attempt to summarize legally significant events relevant to the law of the seas. This article, the first to be prepared on a continuing annual basis, covers significant state, national, and international events that occurred from July 1, 1969 to March 15, 1970. The major topic headings are Conservation, Fishing, Minerals, Navigable Waters, Pollution, Salvage, Seabed, Shipping, Sovereignty, Water, Wildlife, and Zones. [68 footnotes] FTP

9.19 WATER QUALITY AND THE ABSENCE OF FISH
(1.0146)(1.37) FROM SOME POLLUTED ENGLISH RIVERS
(1.92)

Brown, Vincent Maurice, D. G. Shurben, and Dennis Shaw (Water Pollut. Res. Lab., Stevenage, England)
Chemical Abstracts 74, No. 1, 1590g (January 4, 1971)

0.2 (4.3)(0.321) STABILITY OF OIL-IN-WATER EMULSIONS. 1. EFFECTS OF SURFACE TENSION, LEVEL OF OIL, VISCOSITY AND TYPE OF MEAT PROTEIN

Acton, J. C., and R. L. Saffle (Department of Food Science, University of Georgia Experiment Station, College Station, Athens, Ga. 30601)
Journal of Food Science 35, No. 6, 852-855 (November-December 1970)

Various meat proteins show large differences in their capacity to emulsify oil-in-water mixtures and in their ability to stabilize such emulsions. The purpose of this study was to determine the effects of surface tension of solutions, level of oil emulsified, and viscosity of the emulsion, on the stability of oil-in-water emulsions containing protein of various types of meat.

Salt-soluble protein was extracted from cow meat, beef hearts, beef cheek meat, pork trim meat, and pork cheek meat. The surface tension responses with these solutions of salt-soluble protein followed the Type III curves assigned to surface active agents [P. Becher, Emulsions: Theory and Practice, 2nd edition, Reinhold Publishing Co., New York, N.Y., 1965]. The stability of oil-in-water emulsions prepared using the salt-soluble protein of meats was significantly affected by the concentration of the protein and the level of oil. As the concentration of protein or of oil was increased greater stability of the emulsion was achieved. The emulsions prepared from protein of each type of meat showed similar responses for stability. High correlation was found between the protein surface activity and the stability of the emulsion. The viscosity of the emulsion changed little except at the upper levels of protein and oil tested.
[3 figures, 8 tables, 17 references] FTP

2.114 (0.8) NEW PORPOISE-ACTION PROPELLER IN PRODUCTION

Anonymous
Western Fisheries 81, No. 2, 37 (November 1970)

[U.S. Patent 3,504,990 (April 7, 1970); Undulating Flow-Promoting Rotor and Assemblies Embodying Same]

An Australian has invented a new type of propeller that is particularly applicable for use on fishing vessels and various small craft. The design (the blades are lobed and totally devoid of tips) was inspired by the smooth, effortless swimming action of the porpoise. In operation, the propeller creates less turbulence than conventional propellers do, yet it is more efficient than they when the engine is in high-reverse thrust, as is necessary when the vessel is operating near rocky shores. Moreover, it has less tendency to foul lines and nets.
[1 photograph] LB

1.011 (1.30)(9.12) FRASER SOCKEYE REARING SYSTEM UNDER-UTILIZED

Cooper, Al (International Pacific Salmon Fisheries Commission)
Western Fisheries 81, No. 4, 38-40 (January 1971)

Calculated on the basis of lake area and plankton abundance, the sockeye-rearing capacity of the Fraser River system is 600,300 plankton-acres, of which only 29% is being used by sockeye spawners. If the Fraser system's rearing capacity could be fully realized, the sockeye available to fishermen would be increased by 8,300,000 fish a year. The lack of use can be attributed to the lack of spawning grounds in a number of lakes or to deterioration of the spawning grounds as a result of watershed development. Artificial spawning channels, which require only 1/5 to 1/7 as many spawners as natural channels require to produce an equal run, would open the unused rearing areas and increase existing stocks. Although spawning grounds for pinks, which do not require lake rearing areas, are ample to produce a run two or three times the size of the 1967 run, environmental conditions on some of them may be limiting their effective capacity. Planning and design work on the channel projects are well ahead of available appropriations.
[2 tables] LB

9.17 (9.19) EFFECTS OF PHYSICAL AND CHEMICAL CONDITIONS ON THE DETOXIFICATION OF ANTIMYCIN

Lee, Terrence H., Philip H. Derse, and Stephen D. Morton (WARF Institute, Inc., 506 Walnut Street, Madison, Wis. 53701)
Transactions of the American Fisheries Society 100, No. 1, 13-17 (January 1971)

Antimycin is an antifungal antibiotic derived from the bacteria, Streptomyces sp., and discovered by Dunshee, Leben, Keitt, and Strong (1949). Derse and Strong (1963) reported its toxic effects to goldfish at extremely low concentrations and its possible usefulness in fish management.

Laboratory studies using both fish and yeast assays were made to determine the effects of various physical and chemical conditions on the toxicity and stability of antimycin. Chemical studies determined that pH is the most important factor. Half-lives of antimycin for pH's of 4.5 to 11.0 varied from over seven hours to six minutes. Alkalinity and hardness were of no significance. Sorption on Lake Mendota, Wisconsin sediments was negligible up to suspended solids concentrations of 1.5%. The half-life in sunlight of antimycin in distilled water was less than 10 minutes; at 200 foot candles about the same as in darkness. Mortality time for fish increased by approximately a factor of three for 4 C compared to 24 C. Use of ethanol as an anti-freeze for winter use was satisfactory.
[3 figures, 1 table, 7 references] Reprinted in part

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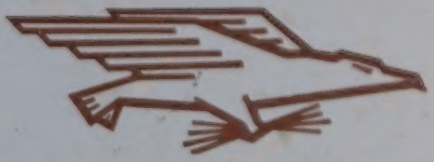

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U.S. DEPARTMENT OF COMMERCE